THE IRON TRADE REVIEW

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Pig Iron Buyers Flock Into Market

And Are Eager to Place Orders—Prices Generally Advanced—Activity in Finished Materials Continues

MANY buyers of pig iron have come into the market during the past few days, not only to fill their needs for the remainder of this year, but also to contract for the first half of next year. The market is much stronger and sellers are holding a firm position, especially as to sales after Jan. 1, which they are not willing to make except at fair advance in price. Pending inquiry in New York amounts to about 30,000 tons, including 10,000 to 15,000 tons of basic. Other inquiries for basic are for 18,000 tons from the Whitaker-Glessner Co., for its Portsmouth, O., plant; 10,000 tons from the Kokomo Steel & Wire Co., Kokomo, Ind., both for last half; 3,000 tons from a Cumberland, Md., buyer for the last quarter, and a speculative inquiry for 10,000 tons, in the Philadelphia market. The demand in New York, Cleveland, Chicago and Pittsburgh shows more activity for all grades. Following the improvement in demand, moderate advances in quotations have taken place throughout the country.

If there is any danger at present, it is that the market will become unduly excited, after the fashion of the recent hysteria in Wall street, but conservative influences are at work. Pig iron production in July amounted to 2,563,311 tons, a gain of 193,379 tons over June.

Coke

The coke market has not yet developed strength in harmony with the improvement in pig iron and finished materials. It is probable, however, that the surplus production is only temporary and that prices will soon advance.

Iron Ore

The shipments of Lake Superior ores for July amounted to 7,204,021 tons, compared with 5,784,514 tons in July, 1914, and 8,204,416 tons in July, 1913. Indications are that the movement for the season will be about 42,000,000 tons. It is estimated that sales of lake ores to eastern furnaces this year, to date, amount to about 500,000 tons, not including the Pennsylvania Steel Co., which has taken some tonnage from the mines of the Cambria Steel Co. The high cost of smelting Cuban ores, as compared with lake ores, is receiving the serious consideration of some blast furnace operators.

Billets and Sheet Bars

Many important producers of semi-finished material are sold up for the remainder of the year and are unwilling to take on any further business at the present time. Eastern makers are declining to take tonnage for export on account of their sold-up condition. Mills in the Chicago district are being so pressed to meet the demand in that part of the country that they probably will be compelled to stop shipping billets and sheet bars to Pittsburgh plants.

Scrap

One of the most interesting features of the market is the improvement in scrap, and while in New York excitement in the old material market is attributed to brokers, legitimate advances have been made in several leading centers and the trend is distinctly upward. In Chicago, however, prices evidently advanced too rapidly and some weakness has developed. In Cleveland, there has been a sudden turn upward and prices are from 25 cents to $1 a ton higher.

Shapes, Plates and Bars

Representatives of foreign countries are having much difficulty in placing orders for large tonnages of rounds for the manufacture of shrapnel. Mills are so well supplied with orders for bars that they are very conservative about taking on more tonnage. A Canton concern is in the market for about 15,000 tons, mostly alloy steel. Demand for shapes continues active, in spite of the fact that awards for new buildings are not numerous. Four tank steamers, placed for building at Atlantic ship yards, will call for from 16,000 to 20,000 tons of shapes and plates. The plate market is gaining in strength and the outlook is that 1.35c, Pittsburgh, will soon be the prevailing quotation on shapes, plates and bars. Nuts, bolts and rivets are more active and prices are firmer.

Labor Agitators Making Trouble

Strikes and General Unrest a Source of Uneasiness in Machinery Trade—War Demand Breaks Records in July

MOST significant in the developments in the machine industry during the month of July was the outbreak of strikes at various plants which are operating to capacity by reason of large war contracts, and the suddenly inceased activity of labor agitators in organizing workmen and in formulating demands for presentation to the operators of such plants. In most cases the action of the workmen was no surprise since the strikes and agitation are the natural culmination of a movement which became distinctly noticeable more than two months ago, as previously announced in *The Iron Trade Review.* So far, labor troubles at most of the plants involved have been only of a temporary character, since the employers involved quite uniformly have considered it just or advisable to accede either in whole or in part to the wishes of the workmen. Among thoughtful employers, however, there is a disposition to speculate as to whether or not more serious labor troubles are reserved for the future. As is well appreciated, there is a scarcity of skilled labor, at least throughout the east, and this condition, in conjunction with the urgent character of the big contracts for war munitions and machine tools to manufacture such munitions, gives the workmen a feeling of assurance and independence such as they seldom before have known. What policy, therefore, shall be pursued in regard to labor, which shall succeed in conciliating the workmen, without jeopardizing the immediate or distant future of industry in general, is a problem now uppermost in the minds of employers.

Tremendous Export Demand

WHILE further large purchases of machine tools were made by domestic interests engaged in the manufacture of munitions of war, the feature of the market during July was the unprecedented volume of export demand. Inquiries came out without limit from large European concerns or their representatives in this country, and from agents of the belligerent governments. One inquiry numbered approximately 1,000 machine tools; others involved several hundred each. During the month a tremendous amount of machinery business was booked for export; a large portion of the demand, however, cannot be filled since foreign buyers hesitate to commit themselves for the distant deliveries that are now offered.

Because of the difficulty involved in securing deliveries one large machine tool house is of the opinion that a shrinkage in foreign demand can be expected to develop from now on. Some makers of automatics are sold up as much as nine months ahead. It practically is impossible to secure deliveries on 14 to 16-inch engine lathes before November, on small screw machines before October or November, on automatic screw machines before next January or February, on turret lathes before next February, on complete rifle-making units before February, etc. Particularly satisfactory was the spreading out of the foreign demand to involve large numbers of shapers, planers, drills, etc. As a result, a good many manufacturers of such machines are sold up a few months ahead. Prices on lathes were advanced another 10 per cent by Cincinnati manufacturers, making the present prices about 35 per cent higher than they were at the beginning of the year.

Many Concerns Buy Heavily

AMONG large domestic war munition makers who bought heavily during the month were the New England Westinghouse Co., the Remington interests, the International Steam Pump Co., General Vehicle Co., Long Island City; New York Air Brake Co., Crocker-Wheeler Co., Oliver Typewriter Co., Chicago; Edwards Valve Co., Chicago; American Locomotive Co., Lake Torpedo Boat Co, Bridgeport, Conn.; Hendee Mfg. Co., Springfield, Mass.; Winchester Repeating Arms Co., and many others. Among concerns which were reported as having booked large new war contracts were the Baldwin Locomotive Works, the Garland Corporation, Pittsburgh; the Westinghouse interests, the Sturgis & Burns Mfg. Co., Chicago; the Bartlett-Hayward Co., Baltimore; the Spedden Ship Building Co., Baltimore, and others.

Domestic demand showed considerable improvement during the month. The most important buying of this character was done by the Ford Motor Co., Detroit, which placed orders for fully $500,000 worth of machine tool equipment. Corrigan, McKinney & Co., Cleveland, issued an inquiry involving more than 40 tools for installation in its new steel plant. The Morrow Mfg. Co., Elmira, N. Y., was an extremely large buyer during the month.

Railroads Are Waking Up

THE only railroad buying of consequence was that done by the Chicago, Burlington & Quincy, but the business distributed by this road was the most important which has come from the railroads in some time. Orders were placed for over 50 tools involving a large expenditure. During the month the Seaboard Air Line issued a list involving about 100 tools; developments since, however, indicate that but little business will result from this list in the near future. A good many railroads issued inquiries for a few tools, and on the whole July witnessed more interest on the part of the railroads in regard to their machine tool requirements than any other month this year.

Steel Works Enlarge Capacity

BUILDERS of steel plant equipment have been booking a better volume of business and the outlook for a continued improvement in this direction is bright. The Republic Iron & Steel Co. has begun to award contracts for two new tube mills and two new open hearth furnaces, as well as for other improvements. The Youngstown Sheet & Tube Co. has awarded contracts for a new bar mill department. The Trumbull Steel Co., Warren, O., is considering the construction of additional sheet capacity. The Valley Mold & Iron Co., Sharpsville, Pa., may extend its plant. No large lettings featured the domestic crane market, but some good orders were entered from abroad for locomotive cranes.

MEN OF MACHINERY TRADE

Who they are Where they are What they are doing

ILL HEALTH has compelled the resignation of Hector MacLean, secretary and treasurer of the Michigan Bolt & Nut Works, Detroit. Mr. MacLean has been associated with the company for 20 years. His first position was that of timekeeper, in 1895. He was successively promoted to the responsibilities of purchasing agent, secretary, and secretary and treasurer, which latter positions he has held since 1910. Robert H. Hill, who succeeds Mr. MacLean as secretary of the organization, is a native

HECTOR MacLEAN

of Southington, Conn. His first position was with the Beaton & Bradley Co., Southington. He was associated with the Upson Nut Co., Cleveland, from 1898 until July of this year, when he resigned to take up the new work with the Michigan Bolt & Nut Works. The present officers of the Michigan Bolt & Nut Works are: Levi L. Barbour, president; F. S. Bigler, vice president, treasurer and general manager; Robert H. Hill, secretary.

J. E. Lord, associated until recently with the Buckeye Engine Co., is now manager of the Chicago office of the Nordberg Mfg. Co., Milwaukee, Wis.

John W. Harrington, of the Harrington & Richardson Arms Co., Worcester, Mass., returned home this week from Paris, where he has been on a business and pleasure trip since April. It was his second trip abroad since the outbreak of the war, and included visits to England.

W. E. Choate has resigned as general manager of the Carr Fastener Co., Cambridge, Mass., and is now associated with the Advance Machine Co., Boston, in a similar capacity.

T. Omdal, late of the Lieberman & Sanford Co., New York, is now a partner in the Equity Iron Works, Brooklyn, N. Y.

W. S. Robertson has been appointed secretary of the American Locomotive Co. to fill the vacancy caused by the resignation of C. B. Denny.

J. E. MacArthur, formerly superintendent of the Keystone Mfg. Co., has been appointed general superintendent of the Robinson Fire Apparatus Mfg. Co., St. Louis.

W. B. Gould, formerly associated with the Jones & Lamson Machine Co., Springfield, Vt., has joined the machine tool department of Fairbanks, Morse & Co., New York.

J. M. Toppin has been made general manager of the Rhodes Mfg. Co., Hartford, Conn. Mr. Toppin was for several years with the General Electric Co., Pittsfield, Mass.

E. W. Swartwout, until recently a member of the Chicago staff of the Nordberg Mfg. Co., Milwaukee, Wis., is now with N. M. McLaren in the company's New York office.

D. F. Geissinger, formerly with the Chicago Pneumatic Tool Co. at its Pittsburgh office, has recently taken charge of the Erie, Pa., office of the Baird Machinery Co., with offices in the Marine Bank bldg.

Geo. W. Cobb, assistant general sales manager of the American Can Co. was injured seriously in an automobile accident not far from Rochester on July 28. His recovery is expected. Mr. Cobb lives in Montclair, N. J.

E. R. Ayles, formerly assistant treasurer of the Trussed Concrete Steel Co. at Youngstown, has resigned his position and returned to Detroit, being succeeded by A. W. Chaffee, of Detroit.

J. A. Durfee, who has been connected with steel plants in New York, Ohio and Georgia, has accepted a position as metallurgist at the South Side works of the Jones & Laughlin Steel Co., Pittsburgh.

Albert J. Ott, formerly with the Landis Tool Co., is now western representative for the Modern Tool Co., Erie, Pa., manufacturer of self-contained grinding machines and precision tools. Mr. Ott has offices at 32 North Clinton street, Chicago.

W. T. Dunn, until recently associated with the Carpenter Steel Co., Reading, Pa., in Boston and New England, has resigned to become district sales representative of the International High Speed Steel Co., New York, for New England and Eastern Canada.

Mayor George M. Wright, president of the Wright Wire Co., Worcester,

ROBERT H. HILL

Mass., is planning to leave this week on a short business and pleasure trip through the middle west as far as St. Louis. Labor troubles at the company's Palmer, Mass., mill delayed his trip for more than a week.

Sidney J. Marshall, who resigned a month ago from the offices of secretary and treasurer of the Globe Malleable Iron & Steel Co., Rochester, N. Y., was elected president and treasurer of the Endicott Forging & Mfg. Co. at a meeting of directors of the new concern. The latter company has taken over the White Forging & Mfg. Co., at a meeting of directors of the new concern. The latter company has taken over the White Forging & Mfg. Co.'s plant at Endicott. Other officers are William H. Stone, Binghampton, vice president, and Thomas A. MacClary, Union, secretary.

New Steel Plant

Is Inspected and Congratulations Are Extended

Youngstown, O., Aug. 3.—A party, comprising 100 stockholders, officials and guests of the Youngstown Iron & Steel Co., boarded a special train at Haselton today and inspected the company's new steel plant at Lowellville. The first steel was poured last Saturday. The plant is modern in every respect, well equipped and excellently constructed. Installation of three open hearth furnaces has been completed, with a capacity of about 15,000 tons of steel a month. Other equipment includes two 4-hole soaking pit furnaces, one three-high 30-inch combination blooming and sheet bar mill, one 24-inch bullhead stand and a 40-inch universal plate mill, having a capacity to roll plates 20 to 40 inches in width. The plant also is equipped with a battery of 18 Laughlin gas producers to be used in case the supply of natural gas fails.

Stockholders of the company held their annual meeting, transacting routine business. The annual report was read and accepted as highly satisfactory. Retiring officers and directors were re-elected. Officers are: President, John O. Pew; first vice president, Henry W. Heedy; second vice president and secretary, C. A. Cochran; treasurer, Mason Evans; general superintendent, C. B. Cushwa; counsel, C. D. Hine; the foregoing, with L. B. McKelvey and G. F. Danielson, comprise the board of directors. Mr. Danielson is superintendent of the pressed steel department and H. E. Smith of the open hearth department.

Many practical iron and steel men were present at the formal opening of the plant and united in extending their warm congratulations to President Pew and others of the management.

In Market for Lathes and Machinery

C. K. Turner & Son, 116 Broad street, New York City, are inquiring for 10 ordinary engine lathes, 10-inch swing, 8-foot bed, also special offers of lathes for early delivery. In addition, a complete estimate is desired of hydraulic machinery to turn out 6-inch shells, 30 inches long, for an output of 30,000 shells a month, calculated on working 100 hours a week. An order recently was placed with a British manufacturer, but a further order soon is to be placed. The British manufacturer calculated that for such an output he required the following equipment:

Five 450-ton vertical combined piercing and drawing presses, approximate weight 40 tons each; three 200-ton vertical cylinder pointing presses, approximate weight 8½ tons each; two 550-ton type banding presses, approximate weight 8½ tons each; three 200 brake horsepower, electrically driven, 3-throw hydraulic pumps, approximate weight 2¼ tons each; one 26-inch x 20-foot hydraulic accumulator, weight 90 tons.

Will Build Furnace and Coke Plant

George W. Niedringhaus, vice president and general manager of the National Enameling & Stamping Co., has announced that the company has approved plans for the making of pig iron and coke in a plant to be erected within six months adjoining the steel mills of the National Enameling & Stamping Co. at Granite City, Ill.

Mr. Niedringhaus said the plans would mean an outlay of from $1,000,000 to $3,000,000. Work will be started as soon as the necessary funds are set aside by the directors of the company. The enterprise, he said, is entirely that of the National Enameling & Stamping Co.

Wages Unchanged

Pittsburgh, Aug. 3.—Wages of sheet workers were unchanged for July and August. This was determined at the bi-monthly examination here on July 28 of the sales sheets of the Brier Hill Steel Co., the National Stamping & Enameling Co., the Newport Rolling Mill Co., and the Whitaker-Glessner Co., sales of Nos. 26, 27 and 28 gages having been made at the base rate. In accordance with an understanding between manufacturers and the Amalgamated Association of Iron, Steel and Tin Workers, the wages are not announced.

In Market for Coal

W. S. Barstow & Co., controlling the General Gas & Electric Co., announce that they are in the market for 250,000 tons of slack coal for delivery at Easton, Pa., and neighboring properties; and 15,000 tons for delivery at Binghamton, New York.

Communications should be addressed to F. C. Rose, general purchasing agent, 50 Pine street, New York City, N. Y.

The Johnston & Jennings Co., Cleveland, has let contract to the Hunkin-Conkey Construction Co., that city, for a foundry estimated to cost $5,000.

Trade Extension

Investigated by Special Agent Who Will Visit Manufacturers

J. A. Massel, special agent of the department of commerce, who recently returned from a trip through South America, where he investigated the possibilities of extending sales of American built machinery and machine tools, has been instructed by the department to make a tour of the machine tool manufacturing centers in this country. He will visit concerns in Buffalo, Boston, Cleveland, Cincinnati, Chicago and other cities. Mr. Massel will talk over South American possibilities in a general way with the manufacturers he visits, but will make a special effort to interest manufacturers in placing exhibits of their products in the National Industrial School at Buenos Aires, Argentina. The machinery now installed in this school, said Mr. Massel, is, with few exceptions, of English or German make, most of it having been donated by concerns in those countries. As a result, the students become familiar with these machines and specify them later when they have entered business. The attendance at the school, said Mr. Massel, includes some 500 students from all parts of Argentina, who pursue special studies, including practical work with machinery and machine tools, and upon graduation they go out into all parts of the republic and take responsible positions. The initial expense of making such donations, said Mr. Massel, should prove a profitable investment in the long run.

Installing Electric Furnaces

Arrangements have been made by the United Steel Co., Canton, O., for installing a second Heroult electric steel furnace of the 15-ton type. Sometime ago the United company received an original license from the United States Steel Corporation for a six-ton Heroult furnace. Armstrong-Whitworth of Canada, Ltd., Montreal, also have been licensed by the Steel Corporation to install a 3-ton Heroult furnace.

Corey on War

W. E. Corey, former president of the United States Steel Corporation, returned from France, Aug. 3. Mr. Corey declares that the present war probably will continue for three years, as the allies are making preparations that far ahead.

Rapid Increase in Pig Iron Output

July Production is 71 Per Cent Greater Than December—Best Monthly Total Since June, 1913—More Stacks Resume

THE improved conditions in the iron and steel industry are revealed clearly by the figures showing the production of coke and anthracite pig iron in July. The total output last month was 2,563,311 tons compared with 2,369,932 tons in June, a gain of 193,379 tons.

Last month's production was the largest of any month since June, 1913.

MONTHLY PRODUCTION.

	1915.	1914.	1913.
January	1,591,024	1,879,336	2,787,800
February ...	1,666,592	1,888,607	2,578,670
March	2,046,280	2,341,551	2,762,823
April	2,114,518	2,261,501	2,754,353
May	2,255,157	2,097,019	2,816,825
June	2,369,932	1,904,566	2,616,883
Total 1st half	12,043,503	12,372,580	16,317,354
July	2,563,311	1,955,324	2,558,275
August	.....	1,996,483	2,537,018
September .	.....	1,882,718	2,494,098
October ...	.....	1,767,227	2,539,924
November ..	.....	1,501,269	2,229,960
December ..	.....	1,495,325	1,976,138
Total 2d half..	.....	10,598,346	14,335,413
Grand total	14,606,814	22,970,926	30,652,767

The production in July was at the rate of 30,180,000 tons, which compares with an actual output of 23,000,000 tons in 1914. The ability of the blast furnace industry to recover rapidly from a period of prolonged depression, is shown by a comparison of last month with December, 1914, which month marked the low point in last year's decline. July shows a gain over

AVERAGE DAILY PRODUCTION.

	1915.	1914.	1913.	1912.
January	51,323	60,624	89,929	66,220
February	59,521	67,450	92,095	72,372
March	66,009	75,534	89,123	77,791
Apr.	70,484	75,383	91,812	79,254
May	72,747	67,646	90,865	80,753
June	78,998	63,486	87,229	81,125
July	82,687	63,075	82,525	77,502
August		64,403	81,839	80,650
September		62,757	83,137	81,482
October		57,007	81,933	86,569
November		50,042	74,322	87,985
December		48,236	63,746	89,590
Average	68,900	62,934	83,980	80,124

December of 1,068,000 tons or 71 per cent. Comparing last month with July, 1914, a gain of 608,000 tons or 31 per cent is shown.

There was a net gain of 13 in the number of active stacks last month. Five merchant furnaces were relighted and four blown out. Fifteen steel works furnaces resumed and three were blown out. On July 31, 234 stacks were active compared with 221 on the last day of June. The number of active furnaces is the largest since October, 1913. In comparison with November, 1914, when only 150 stacks were active, July shows a gain of 84 stacks, or 56 per cent.

The average daily output during July was 82,687 tons against 78,998 tons in June, a gain of 3,689 tons. The steel works or non-merchant furnaces were responsible for practically all of this gain. Their average output in July was 62,795 tons against 59,182 tons in June, a gain of 3,613 tons. The production of merchant iron in July was at the average daily rate of 19,196 tons against 19,169 tons in June, a gain of 27 tons.

The total production of steelmaking iron in July was 1,946,645 tons against 1,775,459 tons in June, a gain of 171,186 tons. The merchant furnaces produced 595,070 tons in July and 575,077 tons in June, a gain of 19,993 tons.

The production of ferro in July was 11,540 tons against 9,379 tons in June, a gain of 2,161 tons. The July output of spiegel was 10,056 tons, compared with 10,017 tons in June, a gain of 39 tons.

Will Build Foundry

Construction work will begin this week on a foundry to be erected in St. Louis by the Gravois Foundry & Mfg. Co. upon ground which the company purchased a week ago on the west side of Thirty-eighth street, south of Deler street, in that city. The building, which will be about 60 x 150 feet, will be of steel frame, with walls almost entirely of glass, and will have a gravel roof. The foundry will be a high one-story structure. The Gravois company, which obtained articles of incorporation two weeks ago, will manufacture castings and make patterns. The officers are W. B. Jones and Frank Kroupa.

Would Reduce Foreign Purchases

A press cablegram from Paris says that under the generalship of the under secretary of war, Albert Thomas, who is virtually "minister of munitions", the chamber of deputies has passed a law requiring the declaration of all metal lathes, hydraulic presses and steam hammers, of a weight of more than two tons. Failure to make such declarations will entail a penalty of from $10 to $200; the same penalty will be exacted in case of fraudulent declaration.

The purpose of the law, which is termed the "mobilization of industrial resources", is to insure the maximum productive efficiency of materials of war, to organize systematically the immense number of plants which have been proffered for the making of munitions, and to bring about a reduction of foreign purchases.

The United States district court has ordered Harold B. Wells of Bordentown, N. J., receiver of the Florence Iron Works, Florence, N. J., to operate the plant until Sept. 7, at which time it will be determined whether the property will be sold or operated further.

JULY PIG IRON

States.	No. of stacks.	No. in blast last day of month. July.	June.	Total tonnage made. Merchant.	Non-Merchant.	Totals. July.	June.
Pennsylvania	157	98	94	150,054	957,833	1,107,887	1,005,998
Ohio	73	50	48	146,452	455,026	601,478	574,870
Alabama	45	20	18	107,148	58,514	165,662	158,760
Virginia	22	4	5	20,689	.....	20,689	20,526
New York	26	18	16	77,044	100,853	177,897	172,675
New Jersey	6	1	1	5,961	.....	5,961	6,240
Illinois	26	15	12	23,615	179,998	203,613	167,109
Colorado	6	2	2				
Indiana	10	10	10				
Maryland	4	2	2				
Wisconsin	6	3	3	23,988	182,848	206,836	193,653
Kentucky	7	0	1				
West Virginia	4	3	1				
Tennessee	18	5	5				
Washington	1	0	0	15,373	11,573	26,946	27,184
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	1	1	1				
Michigan	3	2	2				
Missouri	1	0	0	24,746	.....	24,746	23,521
Spiegel—All states....						10,056	10,017
Ferro—All states....						11,540	9,379
Totals	421	234	221	595,070	1,946,645	2,563,311	2,369,932

THE OPEN HEARTH

Stop Vicious Manipulation

THE WILD speculation which has continued on the New York stock exchange for several weeks is becoming a menace to all legitimate business in the country. If only the gamblers who are manipulating the market with the purpose of fleecing the innocent or venturesome representatives of that body usually spoken of as the public were to sustain heavy losses when the crash comes, there would be no cause for regret, but unfortunately such a crash cannot come without inflicting serious injury upon thousands of people with good intentions who cannot afford to lose the money. In addition to the losses which would be deplored, would come a general demoralization of business.

Men who have been observers of Wall street for half a century say that while there have been manipulations in the past, those that are now being carried on are more open than any ever before perpetrated. It is asserted in well informed circles that the stock exchange could stop the garmbling if it desired to do so. The question is—Will it act? During the past year when, owing to the war, extremely difficult problems were presented, the governors of the exchange acquitted themselves with great credit. They demonstrated their power to prevent an extremely serious situation. Will the governors face present conditions and put a stop to the manipulation which is now going on with the deliberate purpose of forcing up prices and bringing ruin to thousands? It is high time for public sentiment to be aroused so that the governors will see the necessity of quick action.

The Iron Trade's Progress During a Year of War

LOOKING back over the year since the great powers of Europe declared war, the course of the markets displays many interesting features. The first half of the year 1914 had ended, as stated by *The Iron Trade Review* of July 2, with many hopes not realized and positive indications of early prosperity lacking in spite of the fact that nature was doing its part magnificently in the production of wonderful crops. Towards the middle of July, there were some encouraging reports from Steel Corporation plants and the Corporation was operating at about 65 per cent of ingot capacity, but the general conditions were very unsatisfactory. There was a difference of opinion as to the future, the most optimistic observers believing that business would improve during the last half of the year, while many believed that under the low tariff the country was bound to have a period of profound depression, while imports would seriously compete with American products.

After the declaration of war, interest was centered early in August in finances. There was much uncertainty as to the future of business, and although it was recognized that the war acted as a tariff wall in excluding imports to a large extent, and it was believed that golden opportunity was opening for the United States to capture much of the business that had been enjoyed by the belligerents, particularly England and Germany, there was very marked hesitation about making investments and new buying was light. Financial conditions dominated the situation, but as problems relating to money were gradually straightened out, the feeling in the market became more cheerful. This change in sentiment was helped along during September and October by the arrival of some inquiries for iron and steel from foreign countries. Export business developed very slowly, however, and about Oct. 15, the continuation of dullness in domestic demand and failure of foreign inquiries to be converted into orders of appreciable size, began to have a depressing effect on prices. Pig iron, especially in the Buffalo district, receded to lower levels, semi-finished quotations were lower and there was weakness in nearly all products. In October, however, orders from Germany, France and Russia brought new life to the machine tool business. In November, many steel plants were operating at as low as 30 per cent capacity and the Steel Corporation had the smallest volume of orders in proportion to its capacity at any time in its history. The year closed with business at low ebb.

During the first month of the new year, business improved somewhat, and in February, the Corporation pushed up its operations to about 60 per cent of ingot capacity. Orders for war materials were placed in larger quantities. In April, announcement of the plan of the Pennsylvania lines to expend fully $25,000,000 brought much encouragement, but buying by other railroads was not on a similar scale. Throughout May, June and July, war orders were received in large volume, domestic improvement was moderate and the general outlook became more encouraging. The Steel Corporation, which was operating at 72 per cent of ingot capacity early in May, increased to 93 per cent the last week of July. The demand for machine tools during the past three months of the period assumed tremendous proportions.

Prices of pig iron during the 12 months of the war have shown little change. Bessemer advanced from $14.90, Pittsburgh, to $15.20; basic, from $13.90 to $14.20. No. 2 foundry, which was quoted at $13.90, Pittsburgh, on Aug. 6, 1914, commanded about the same price until a few days ago, when prices were generally

THE OPEN HEARTH

advanced about 25 cents. Bessemer billets advanced from $19 to $22, Pittsburgh; bars and shapes, from 1.15c to 1.30c, and plates from 1.10c to 1.30c. During a part of the year, shapes, plates and bars sold at 1.05c, Pittsburgh. It will thus be seen that while pig iron has remained almost stationary, semi-finished steel has advanced $3 per ton, and finished materials from $3 to $5 per ton.

Developments during the past few days, especially in the pig iron market, have been highly encouraging. The pig iron market has been very slow indeed to catch up with the improvement which has taken place in finished materials, but now melters are coming into the market, not only to buy any tonnage needed for the remainder of this year, but also to cover their probable requirements for the first half of next year. Naturally the sellers are slow to quote for delivery after Jan. 1. There is uncertainty as to costs, especially as to the price of coke, and sellers believe that they will be entitled to enjoy a reasonable profit on their sales for delivery into next year. In view of the fact that there has been very little profit in the making of pig iron for a number of years, their present position is justified. The lake ore trade has also been very slow to feel the effect of improvement in finished materials, but the record of shipments for July shows that the present season's movement is proceeding at a rate which, a few years ago, would have been indicative of great prosperity. A favorable feature of the ore market is the disappearance of cutting of prices.

No one can state definitely the extent to which domestic business has improved, nor is it possible to estimate exactly the effects of the war, but it is perfectly clear that very satisfactory progress has been made in increasing plant activities and that in all probability there will be demand for increased production throughout the remainder of this year.

In addition to the progress which has been made directly in industrial affairs, there is reason to be thankful on account of the general improvement in business and the changed attitude of the government toward business. While a year ago anti-trust legislation of very drastic character was receiving attention of congress, the pending bills were amended in important particulars before being passed, and a number of court decisions have tended to clarify the atmosphere and render the life of the business man more tolerable. While the foreign trade of the United States has not increased as rapidly in some directions, notably in South America, as had been hoped, fair progress has been made in laying the foundation for enlarged business with the republics of the southern hemisphere. Various additions and improvements announced by leading steel companies indicate that new courage has come to the steel manufacturers and, on the whole, the outlook is most gratifying. If, indeed, the demand from foreign countries should continue at the present rate, and the domestic demand should assume normal size, the country would enjoy greater prosperity than it has ever experienced.

Credits, at Home and Abroad

THE QUESTION as to what should be the attitude toward credit on the part of manufacturers of the United States who are trying to enlarge their business with South America is worthy of the careful consideration which it is receiving. Investigation has demonstrated that the South American buyers who obtain extended credit are compelled to pay a good round rate of interest on deferred accounts. The German exporters, who have had the reputation of using credit most successfully in extending their trade have, according to *The Americas,* published by the National City Bank of New York, charged a stiff rate of interest. The evidence does not show South Americans are in the habit of repudiating their debts and, if they are willing to pay high interest, exporters may find it desirable to give them plenty of time. If, however, the South Americans are shown that it is much better to pay promptly, it may be possible to do some very successful missionary work along that line.

But before we undertake to educate the South Americans to pay their bills more promptly, it would be well for citizens of the United States to consider whether they are not in danger of getting into the same habits that have characterized a number of the southern republics. The recent suggestion that automobile manufacturers will soon find it necessary to assist in financing the sale of their product in some such way as the manufacturers of farm machinery have done for a long time has been met by Henry Ford, of Detroit, in a very sensible way. He says that his company is not interested in promulgating a plan which extends credits for automobiles, or for anything else. Mr. Ford declares that the farmer gets cash for everything he sells and yet expects to buy everything on credit. He adds: "In South American countries and some of the European countries, they have gotten into the very bad habit of extending long credits, and in the final analysis I have never been able to see where this has done any good. The United States has never gotten into the habit. And yet we are far more prosperous and have been far more successful under our plan than any other country." We heartily endorse the position of Mr. Ford. Let us encourage our own citizens to pay their bills promptly. Then we will be in better position to talk with the people of South America.

Prices Present and Past

Quotations on leading products August 4, average for July, 1915, average for May, 1915, and average for August, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Aug. 4, 1915.	Average for July, 1915.	Average for May, 1915.	Average for Aug., 1914.
Bessemer pig iron, Pittsburgh..	$15.20	$14.88	$14.55	$14.90
Basic pig iron, Pittsburgh.....	14.45	13.88	13.45	13.90
No. 2 Fdy. pig iron, Pittsburgh	14.20	13.60	13.45	13.90
North. No. 2 Fdy., Chgo.	13.00 to 13.50	13.00	13.00	14.00
Lake Superior Charcoal, Chgo..	15.75	15.55	15.25	15.75
Mall., Bess., Chgo.....13.00 to 13.50		13.00	13.00	14.00
Southern No. 2, Birmingham...	10.50	9.75	9.50	10.00
Southern Ohio No. 2, Ironton..	13.25	12.75	12.75	13.50
Basic, eastern Pa.....	14.25	13.85	13.25	14.00
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.50
No. 2X foundry, Philadelphia..	14.50	14.40	14.25	14.75
Ferro mang., Balt., (prompt)..	98.00	101.20	100.00	125.00
Bessemer billets, Pbgh.....	22.00	21.20	19.50	20.00
Bess. sheet bars, Pbgh.....	21.70	21.50	20.00	21.00
Steel bars, Chicago.....	1.49	1.46	1.39	1.36
Steel bars, Pittsburgh.....	1.30	1.26	1.20	1.11
Iron bars, Philadelphia.....	1.22	1.20	1.17	1.20
Iron bars, Cleveland, local del'y.	1.20	1.20	1.15	1.20
Iron bars, Chgo. mill.....	1.20	1.20	1.15	1.07

	Prices Aug. 4, 1915.	Average for July, 1915.	Average for May, 1915.	Average for Aug., 1914.
Beams, Chicago	$ 1.49	$ 1.46	$1 .34	$ 1.36
Beams, Pittsburgh	1.30	1.26	1.20	1.175
Beams, Philadelphia	1.359	1.359	1.359	1.30
Tank plates, Pittsburgh.....	1.30	1.22	1.125	1.16
Tank plates, Chicago.....	1.44	1.39	1.29	1.36
Tank plates, Philadelphia.....	1.359	1.359	1.359	1.30
Sheets, blk., No. 28, Pittsburgh	1.75	1.77	1.80	1.88
Sheets, blue an., No. 10, Pbgh.	1.35	1.35	1.35	1.375
Sheets, galv., No. 28, Pbgh....	4.25	4.55	3.40	2.85
Wire nails, Pittsburgh.....	1.60	1.55	1.55	1.55
Connellsville fur. coke contr...	1.75	1.65	1.65	1.80
Connellsville fdy. coke, contr...	2.25	2.25	2.25	2.36
Heavy melting steel, Pbgh.....	12.00	11.75	11.75	11.50
Heavy melting steel, east'n Pa.	12.50	12.00	11.31	10.50
Heavy melting steel, Chgo.....	11.50	10.15	9.25	9.50
No. 1 wrought eastern Pa.....	13.50	13.00	12.50	12.50
No. 1 wrought, Chgo.....	9.50	8.90	8.75	8.75
Rerolling rails, Chgo.....	11.25	10.00	10.00	11.25
Car wheels, Chgo.....	11.00	10.30	9.75	11.00

(For Additional Prices See Page 288.)

Much Greater Activity in Pig Iron

Is Followed by General, But Moderate Advances in Quotations—Buyers Anxious to Cover First Half Requirements

Pittsburgh, Aug. 3.—For the first time in several years, the pig iron situation is rapidly developing into a seller's market. A great deal of quiet buying is taking place and the movement has gained such an impetus that prices on both steel making and foundry grades have been advanced. Inquiries are considerably heavier and buyers are thoroughly appreciative of the fact that they face a tight market. A substantial buying movement within the next few days is not improbable. Sellers almost invariably limit quotations to last half delivery and would like to see the purchase movement hold off. On the other hand, buyers are bringing considerable pressure to bear in an effort to break in on first half business. Buying is not confined to any particular grade. No. 2 foundry and malleable iron have been advanced to $13.25, gray forge to $12.75 and basic to $13.25, all for prompt delivery, valley.

At present no quotations are being made by large sellers on bessemer for delivery beyond August and while lack of transactions at $14.50 does not justify a higher figure than $14.25, valley, sellers are asking the former figure. Small lots of basic have been sold the past week for $13.50, valley, prompt delivery, and it is reported that one seller in this district has asked a manufacturer of semi-finished material $15, valley, for this grade for delivery in six weeks. Foundry iron sales have been made in a number of cases for $13.25, valley, and transactions are held to justify that figure as the minimum. One of these sales involves 750 tons. Inquiries for 2,000 tons of gray forge and 5,000 tons of bessemer have been put out in this district. In a few exceptional cases, foundry iron has been sold the past week at $13, valley. The recent purchase by the Westinghouse Electric & Mfg. Co. covered requirements for Nos. 1, 2 and 3 foundry iron for last half delivery at its plants in Cleveland and Allegheny, Pa. It is claimed that 5,000 tons were involved and that three-fourth of the tonnage went to Cleveland at $13.50 and the remaining quarter to the Allegheny plant at $13.75. This company has not closed its inquiry for the same grades for first half delivery, said to involve 5,000 tons. The purchase just made is understood to have been from two furnace interests, one with stacks in the east and the middle west and the other with furnaces in Ohio. The average minimum price for bessemer iron, as figured by W. P. Snyder & Co., Pittsburgh, for July was $14.90 as compared with $14.58 in June; basic, $13.85 and $13.54, respectively; foundry, $13.60 and $13.45, respectively. The average on gray forge remained unchanged at $13.20. It is understood that Mattie furnace of the Girard Iron Co., at Girard, O., will be relighted this week. LaBelle Iron Works, Steubenville, O., is relining its No. 2 furnace and will blow it in about Sept. 15. Its other furnace, No. 1, is producing basic iron, the grade that will be made by No. 2. The Shenango Furnace Co. is expected to blow in its No. 4 furnace at Sharpsville, Pa., this month when repairs will be completed.

Consumers Anxious to Cover

New York, Aug. 3.—Both in tonnage closed and now being bid upon, the pig iron market the past week in metropolitan territory has displayed more breadth and snap than at any time in several months. There seems to be a more general movement among consumers to cover upon their requirements after Jan. 1, and much of the current inquiry deals with that delivery. Usually, these buyers are willing to act quickly and they are not averse to paying some advance. The furnaces still are acting conservatively in quoting very far ahead and advances of 25 to 50 cents a ton are asked for first quarter. Prices generally, in fact, are more buoyant, and in this territory business is being done

(*For complete prices see page* 288.)

at higher figures, so that $14.75 to $15, tidewater, for No. 2X, a further rise of 25 cents, now appears to have been established. Buffalo iron now is firm at $13, minimum, for No. 2X. One leading maker there is holding this grade at $13.50, for this year and at $14 for first quarter. Eastern Pennsylvania makers quote from $14 to $14.50, furnace, for No. 2X. Pending inquiries here totaling probably 30,000 tons include 10,000 to 15,000 tons of basic for a consumer buying here for a western plant, delivery to include both this year and first half; 2,500 tons of No. 2 plain for August-March delivery to the Delaware, Lackawanna & Western railroad, for Scranton, Pa.; 2,500 to 3,000 tons of foundry grades for the International Steam Pump Co. for Holyoke, Mass., Elmwood Place, O., and other plants; and 4,000 to 5,000 tons of malleable and other grades for a railway equipment maker for delivery to both eastern and western plants. Among the sales of the week were 6,000 to 7,000 tons of foundry grades for the rest of the year for the American Locomotive Co., which went to Buffalo and New York state furnaces; 1,500 tons of foundry for a Poughkeepsie buyer, taken by Buffalo makers; 1,000 to 1,500 tons of foundry for an Elizabethport shop, which went to Pennsylvania furnaces. Another sale of 5,000 tons was negotiated quietly. For export, 3,000 tons of valley bessemer additional was booked in several lots for Italy at $16.50 to $17, tidewater.

Pig Iron Prices Higher

Philadelphia, Aug. 3.—No sharp increase in pig iron buying has appeared in the market in Philadelphia and vicinity, but the trend of developments all continues in the direction of increasing melt and higher prices. Sales of eastern Pennsylvania furnaces were heavier in July than June, but less than May. Buyers are finding the furnaces in a more independent position, both in taking new business and in making shipments on old orders where specifications have been in arrears. In fact, several thousand tons of basic taken several months ago have been cancelled by the sellers because shipping orders were not forthcoming promptly. The basic market is stronger and $14.25, delivered, is being quoted by most makers or at least 25 cents higher. Some makers find themselves oversold for the rest of the year on this grade at present production and in several cases shipments have fallen behind on which the buyers are showing forbearance, as they are desirous of keeping the metal to their credit. A Cumberland, Md., buyer asks 3,000 tons of basic for last quarter and there is a speculative inquiry for 10,000 tons in the market. In foundry iron, the market is gradually rising and small sales have been made at $15.29, Philadelphia, for No. 2X at $14.50, eastern Pennsylvania furnace. This is above the actual market, however, which is about $14.50 to $15, Philadelphia. The American Car & Foundry Co. was the buyer of 2,000 tons of foundry for Berwick, Pa. Cast iron pipe makers in this territory are more active as buyers. One of them took about 1,000 tons of Virginia iron and is negotiating further. Another pipe works inquiry for 3,000 tons is pending. Standard mill forge is up with $13.75, eastern Pennsylvania, offered. The Virginia situation shows little change and some prices below $12.50, furnace, for No. 2X, still were done this week.

The Low Moor furnace announces an advance of 25 cents Aug. 7, and another of equal size Aug. 15, bringing its price to $12.75 and to 13, respectively, for No. 2X. Standard low phosphorus has been advanced further and sales have been made in this district at $22, delivered. Makers show a disposition to keep down sales, as they are well sold up. Lebanon low phosphorus brands have also been advanced 50 cents to $1 and now are quoted at $17 to $18, furnace. Some round sales of this grade have been closed.

Heavy Inquiry for Basic.

Cleveland, Aug. 3.—Very large inquiry for basic iron has been received by Cleveland firms during the past few days. Other grades are also represented by substantial inquiries. The Whitaker-Glessner Co. is inquiring for 18,000 tons of basic for first half delivery for its Portsmouth O., plant. Some lake furnace have declined to quote and it is probable that purchases will be made from furnaces having a lower freight rate. The Kokomo Steel & Wire Co., Kokomo, Ind., is in the market for 10,000 tons of basic for first half delivery. A number of companies are in a position to bid for this business, but on this and other tonnages pending for the first half, furnaces are advancing quotations. The rule is to ask at least 50 cents per ton more for delivery in the first half than for delivery the remainder of this year. Of the 30,000 tons purchased by the Andrews Steel Co., it is understood a considerable part went to a furnace in the central part of the state. The Dayton Malleable Iron Co., Dayton, O., is in the market for 10,000 tons of malleable.

The Globe Iron Co., Jackson, O., reports that it has made large sales of bessemer ferro-silicon for export and negotiations for additional tonnages are pending. These foreign orders call for silicons running from 14 to 16 per cent, which are difficult to produce, but have been made very successfully by the Globe company. The Globe brand has been withdrawn from the market on both bessemer ferro and silvery grades and it seems probable that bessemer ferro will soon become scarce.

Prices Advance—Basic Sales

Cincinnati, Aug. 3.—Pig iron prices have advanced, due to recent heavy demand, and furnaces are now well sold up for several months. Southern No. 2 foundry is quoted at $10.50, Birmingham basis, for last half shipment. No quotations are available for the first or second quarters of next year, although several good inquiries are pending for that delivery. Southern Ohio No. 2 foundry has been put upon a higher schedule, being now $13.25 for the last half, $13.50 for the first quarter, $14 for the second quarter, and $13.75 for the whole first half, all Ironton basis. Southern Ohio basic iron is given at $13.50, furnace, for the first half, and practically all furnaces are sold up on this grade for the last half of this year. The American Rolling Mill Co., Middletown, O., has taken about 15,000 tons of basic iron, and the Andrews Steel Co., Newport, Ky., has purchased 35,000 tons of the same grade, part of which went to northern Ohio stacks. Two other large melters in this territory are out for basic iron, one for 12,000 tons and the other for 10,000 tons, for first half delivery. A large Ohio melter is inquiring for 10,000 tons of malleable iron for the first half, and a Louisville, Ky., user wants from 2,500 to 8,000 tons of southern foundry iron, also for first half delivery. Other sales include 5,000 tons of charcoal iron into Michigan territory, 600 tons of foundry iron to the Elmwood Castings Co., this city, and 400 tons of foundry iron to the Lunkenheimer Co., also a local melter. Southern Ohio silvery iron has been advanced to $16, furnace, for 8 per cent silicon.

Southern Advances

St. Louis, Aug. 3.—Southern pig iron has risen to $10.50, Birmingham basis, in the St. Louis market, and some furnaces have entirely withdrawn from the market. The inquiry, however, is limited to small tonnages. There is an inquiry out for 2,500 tons of malleable iron, and a sale of 4,000 tons of northern iron was made last week. Northern iron is quoted at $13.50 to $14, Chicago, and $13 to $13.50, Ironton.

Chicago Market Active

Chicago, Aug. 3.—Pig iron in this market seems on the verge of a de-

(*For complete prices see page* 288.)

cided movement as to tonnage and also as to price. After remaining at $13, Chicago furnace, for many months with slack demand, the price now seems best represented by a spread of $13 to $13.50, Chicago furnace. Some sellers have been remaining out of the market recently at the prevailing price while others have seemed content to book iron at that level.. At present all are asking $13.50 for malleable and No. 2 foundry, with concessions in some instances at the former price.

Large inquiry for basic is being put out by interests about St. Louis, one asking for 8,000 to 10,000 for delivery during last and first quarters and another asking prices on 5,000 tons for the same delivery. The American Car & Foundry Co. asks prices on 2,500 tons of foundry iron for its Madison, Ill., plant. Other inquiry totals a large aggregate and indicates an awakening of interest.

Curiosity as to what price will be asked for next year's delivery is behind much of this inquiry and sellers are refusing to quote. However, it is certain $14, Chicago furnace, is the lowest that will be asked for the present on any business beyond this year, and one interest outside the merchant iron field is asking that figure for all deliveries from now on.

Southern iron is stronger and $10, Birmingham, is more difficult to obtain, while $10.25 and $10.50, Birmingham, are more often met. Some southern producers are refusing to quote and are out of the market.

Shipments from furnace yards are being made to an extent that comparatively little iron remains in stock, and nearly all furnaces are shipping more than their make. One furnace is preparing to blow in another stack, if conditions continue to point in that direction.

Improvement Continues

Birmingham, Ala., Aug. 3.—Improvement in the pig iron market continues. Quotation on No. 2 foundry has acquired considerable strength at $10.50, Birmingham, and one maker, on an inquiry for delivery through the first half of 1916 has made a quotation of $12.50.

Furnace activity continues. Five have gone into blast in the past 30 days, two are undergoing repairs at Bessemer for the purpose of relighting, and others are expected to resume operations within the month. More furnaces by the end of August, it is reported, will be in blast at one time than ever before in the history of the district.

Sales during the week were good. The Tennessee Coal, Iron & Railroad Co. is out of the pig iron market, it being understood that the local mills of the company are using about all the pig its furnaces can make. The Bessemer rolling mill is operating full capacity and the Ensley mill is doing likewise on rails and billets, the latter for export to England.

During August the industrial pay roll is expected to reach normal for the first time in two years and great optimism prevails.

Four More Boats Placed

Requiring Large Tonnage of Steel—Plate Market Gradually Gaining Strength

Philadelphia, Aug. 3.—Four more tank steamers, requiring 16,000 to 20,000 tons of steel, largely plates, have been placed within a few days by the Standard Oil Co. with Atlantic yards. Two of these boats will be built by the Newport News Ship Building & Dry Dock Co., and two by the Harlan & Hollingsworth Corporation. The latter yard also has taken a passenger boat for the Wilson line, requiring about 1,000 tons. This tonnage of new boat steel will be furnished by Pittsburgh and eastern Pennsylvania makers. The plate situation in eastern Pennsylvania continues to gain strength and makers now are more concerned over deliveries than new business. One principal maker reports its bookings are the largest in several years and its deliveries run about five weeks. New bookings generally are heavy and operations in most cases are at full capacity. Prices show greater firmness at 1.30c, Pittsburgh, or 1.459c, Philadelphia. Makers are reluctant to name prices for fourth quarter, but one contract was taken by an eastern mill for that period at 1.40c, Pittsburgh.

Plates Gain Strength

Chicago, Aug. 3. — Plates are approaching more closely the price of bars and shapes. Some sellers find no difficulty in obtaining the same price, 1.49c, Chicago, but they may be bought in some quarters at $1 per ton lower in limited quantities. Some unusually low quotations were made in Milwaukee on an order for 1,000 tons by an Ohio maker about two weeks ago, but this experience has not been repeated. Conditions in plates have been improving greatly and the spread between the various finished steel products is lessening.

Pipe May Advance

Pittsburgh, Aug. 3.—Pipe mills are well filled with orders and an advance in black pipe prices soon is expected by some producers. The galvanized situation is easier, oil country goods are moving slowly and pipe for the jobbing trade is showing moderate activity. Prices remain unchanged.

Cast Iron Pipe

For Philadelphia Awarded by General Contractor

New York, Aug. 3.—Announcement now is made that the Standard Cast Iron Pipe & Foundry Co. has received from the general contractor, Edwin H. Vare, 8,900 tons of 6 to 48-inch for the city of Philadelphia, which was bid upon several weeks ago. The price is understood to have been $21.15, delivered. The United States Cast Iron Pipe & Foundry Co. has taken 2,400 tons from the Soraci Contracting Co. for work in Manhattan and the Bronx; 300 tons of 6-inch and 8-inch for West Albany, N. Y., at $23.50, delivered; 610 tons of 10-inch for Ilion, N. Y., and is low on 170 tons of 10-inch for Philadelphia, at $23.30, delivered. Mansfield, Mass., has taken figures on 300 tons of 6 to 14-inch and Philadelphia will receive bids Aug. 14 on 1,015 tons of 6 to 12-inch. Tonnage with eastern pipe shops is holding up well, but makers in this territory say they are unable to see much tonnage ahead, especially in public work. Miscellaneous orders are good. Prices are well maintained.

Little Being Sold

Chicago, Aug. 3.—Little new business is presenting itself in cast iron pipe, and sellers are not busy with new business, giving more attention to filling specifications on former contracts. Kenosha, Wis., has let its intake job to a contractor who has not yet placed the tonnage of unusually large pipe with a foundry. Cambridge, O., is to open bids Aug. 5 on 1,000 tons smaller sizes of iron pipe and also on 500 tons of 24-inch, on which alternate bids for wooden pipe are asked. Award has not yet been made formally of 500 tons of high pressure pipe at Cincinnati, bids on which were opened last week. This will probably go to the leading interest.

(*For complete prices see page* 288.)

Demand for Steel Rounds

For Shell Manufacture Continues—Price of Steel Bars Firm at 1.30c, Pittsburgh, With Advance Expected

New York, Aug. 3.—Buying of large lots of steel rounds for shell manufacture is going forward with no evidence of diminution, as important new inquiries for finished shells continue to be put out by the purchasing representatives of European nations. A larger volume of new shell inquiry seems to be stirring at present than at any time since the beginning of the war. The General Electric Co., which recently inquired for about 30,000 tons of various sizes of rounds averaging 3 inches, has placed 14,000 tons, which it is believed went to a Pittsburgh mill. The inquiries of 12,000 tons and 10,000 tons respectively, for the Hall Signal Co., Garwood, N. J., and for the East Jersey Pipe Co., Paterson, N. J., are still open. Prices on large rounds continue steadily to advance and 2.50c to 3c, mill, is the present quotable range. Many of the mills are so heavily booked on this class of business that they are not anxious for additional orders except at their own price. The regular steel bar demand is expanding and deliveries with the larger mills run three to four weeks. Talk is in the air of another advance soon to 1.35c, Pittsburgh. The present market stands firmly at 1.30c, Pittsburgh, or 1.49c, New York, for third quarter.

Steel Bars Scarce

Chicago, Aug. 3.—Steadiness in steel bars continues, no change being noted since last week, except in larger demand and a better situation on the part of mills as to tonnages and specifications. Deliveries are becoming more remote and the leading interest will be far behind in deliveries the present month, with some product still for sale for delivery in November and December.

No doubt exists as to the present quotation of 1.49c, Chicago, for bars, but, on the other hand, no evidence of an advance from that level is noted.

Still Pending

Philadelphia, Aug. 3.—Most of the large orders for shell bars which have been pending in this territory, including one for 115,000 tons and another for 30,000 tons, still are open. An eastern Pennsylvania maker this week sold 2,000 tons of 3¼-inch rounds and 1,500 tons of 9 to 10-inch shell forgings. The prices now being obtained on this class of material range from 2.50c to 3c, mill. Heavy specifications have continued to come to makers from consumers in this district against regular bar contracts, this being especially true last week to take up unordered quotas for the month of July. New business is not very extensive. A Wilkesbarre axle manufacturer who usually buys 20,000 tons of bars annually is understood to have placed his contract with a Pittsburgh mill. Sales of bars for export are noted at 1.30c Pittsburgh, with full domestic extras. The 1.30c, Pittsburgh price for steel bars is firmly being maintained.

Inquiry for Alloy Steel

Cleveland, Aug. 3.—The bar market continues strong and very active with 1.30c as the minimum and the expectation that 1.35c will soon prevail. The Timken Roller Bearing Co., Canton, O., is in the market for steel, mostly alloy steel, and would like to contract for at least 15,000 tons, but steel companies are disposed to be very conservative in taking on large contracts for high grade material. In fact, this policy prevails in all kinds of steel. On shapes, plates and bars, 1.35c, Pittsburgh, has already been obtained on small tonnages.

Bids for 150 tons of reinforcing bars and 150 tons of rails for reinforcing for the Cambridge Steel works, Cambridge, O., will be received next Thursday.

Higher Prices Expected

Youngstown, O., Aug. 3.—The steel bar market is on a firmly established level of 1.30c, Pittsburgh, in the valleys. The market is constantly gaining strength and it is probably only a question of a short time until higher prices may develop on spot business, provided present demand continues.

Bar Iron Boosted.

Chicago, Aug. 9.—Bar iron is on the up grade and announcement is made of an advance of $1 per ton by one of the larger makers in this district. The quotation by this concern is 1.25c, Chicago mill. Other makers have not yet followed this advance but will do so shortly, as costs have advanced with higher prices for scrap. In fact, this element caused the increase to large degree, nothing in demand dictating a higher price.

However, increasing scarcity of steel bars seems destined shortly to throw a portion of the demand into the hands of bar iron makers and the new level of prices will be a better starting point for advances when the greater demand comes. Mills here are operating at about 50 per cent, as in the past.

Plates, Shapes and Bars Strong

Pittsburgh, Aug. 3.—The market for plates, shapes and bars continues to develop further strength. The 1.30c, Pittsburgh, figure on these grades probably will be advanced to 1.35c in the near future. The 1.30c level, which came out July 15, was well received by the trade, but complaints by customers about deferred deliveries are heard. The Carnegie Steel Co.'s specifications for bar mill products in July were the heaviest it ever had in its history for any individual month. While many large steel bar orders especially are for export, the trade is pleased over the pronounced expansion of the domestic market.

Hoops, Bands and Shafting

Pittsburgh, Aug. 3.—The Carnegie Steel Co. has advanced the price of hoops to 1.40c and the Jones & Laughlin Steel Co. has put the price of shafting up to 65 per cent off on carload lots and 60 per cent off on less-than-carloads, representing an advance of $1 per ton. Demand for both hoops and shafting is strong and earlier contracts are being specified against heavily. Bands continue firm at 1.30c.

Warehouse Orders

Make Good Showing, Reflecting Delayed Deliveries by Mills

New York, Aug. 2.—Warehouse business in metropolitan territory was largest in July of any month of the current year, and it has reflected both the receding deliveries of the mills and the improvement in smaller orders where early delivery has been required. One of the largest interests did 60 per cent more business in July than in June. Prices under the better demand are firm.

Chicago Trade Brisk

Chicago, Aug. 3.—Warehouses find an increasing demand for materials from store, building operations in Chicago being brisker since the settlement of business trades disputes and deferred deliveries from steel mills also having an effect. The latter factor is not being felt materially, however, though it is expected to increase as mills fill their books further ahead. Quotations are unchanged.

D. P. Thompson and H. C. Jones, both of Chicago, have been elected directors of the Inland Steel Co., Chicago, succeeding F. W. Olin, resigned, and Joseph Block, deceased.

(*For complete prices see page* 288.)

Galvanized Sheets

Are More Easily Obtained Owing to Decline in Spelter

Chicago, Aug. 3.—Galvanized sheets are easier to obtain since spelter has declined somewhat and various Ohio mills now are booking business at much reduced prices. In a recent competition for 1,500 tons, bids were made from 3.80c to 4.40c, Pittsburgh, on the basis of No. 28 gage. The tonnage was of a heavier gage than No. 28. Chicago makers have not yet re-entered the market and are simply filling the last of old contracts and making some sheets on special contracts based on spelter prices.

Black sheets hold the firmness gained last week and are quoted at 1.99c, Chicago, for No. 28 gage.

Black Sheets Gain

Youngstown, O., Aug. 3.—The black sheet market is steadily gaining strength in accordance with the upward movement in open hearth steel prices. Several valley interests are asking 1.90c, Pittsburgh basis, for sheets, and producers declare no business can be done under 1.85c, Pittsburgh. Galvanized sheet prices have sagged slightly further with the weakness in the spelter market, a range of 4.25c to 4.50c, Pittsburgh, about representing valley prices.

Good Demand

Pittsburgh, Aug. 3.—Inquiries for sheets, aside from galvanized material, show fair activity. No real market price can be said to exist for galvanized sheets, as each mill is apparently naming figures which are based on its own situation as to spelter. The spread of 4.25c to 4.75c, Pittsburgh, for galvanized No. 28 probably represents the market better than any other range. Blue annealed No. 10 at 1.35c to 1.40c, Pittsburgh, and No. 28 gage black sheets at 1.75c to 1.80c, Pittsburgh, are quoted.

Galvanized Weaker

Cincinnati, Aug. 2. — Galvanized sheets are a little weaker, and demand has fallen off slightly. Sales are mostly fill-in lots, as mills will not quote very far ahead, which is not conducive to large buying. Galvanized No. 28 gage, light, are quoted at from 4.25c to 4.50c, Pittsburgh basis, and black No. 28 gage at 1.80c, Pittsburgh basis, both for nearby delivery.

Tin Plate Makers Sold Up

Pittsburgh, Aug. 3.—Large producers of tin plate report that they are sold up for the remainder of this year. The export demand is increasing with persistency and business is described as being unusually active for mid-summer. No new sales of importance have been made the past week. The price range continues to be 3.10c to 3.20c, Pittsburgh.

Bolts and Nuts

Demand Active and Prices Are Advancing —Rivets Higher

Cleveland, Aug. 3.—The demand for bolts and nuts continues very active and prices are firmer, but the advances announced last week as having been made by some manufacturers are not being maintained in all cases. On rivets, 1.50c for prompt, 1.60c for third quarter and 1.70c for the last quarter may be done on structural rivets, with the usual differential on boiler rivets, but some makers will not accept less than 1.60c for either prompt or third quarter on structural rivets, and one Cleveland firm will not contract even at 1.60c.

Prices are Advanced

Chicago, Aug. 3.—An advance of $2 per ton on structural and boiler rivets has been made, the former being quoted at 1.75c and the latter at 1.85c in carload lots. Bolts and nuts are a trifle stronger, recent competition for business while agricultural implement makers were active having brought out lower prices than prevail at present.

Adhering to Higher Prices

Pittsburgh, Aug. 3.—Producers in this district are adhering firmly to price advances they made on July 21 on nuts, bolts and rivets. The market is declared to be brisk, orders are being placed in large volume and plants are running from four to six weeks behind on contracts. Large machine bolts are quoted at 75 and 10 per cent off, the previous quotation having been 75 and 15 per cent off. Structural rivet prices are maintained at 1.60c and boiler nuts are quoted at 1.70c, representing an advance of $2 per ton over the previous quotation. Square nuts are $6 off list and hexagon nuts are quoted at $6.70 off, an advance of 30 and 40 cents, respectively, per 100 pounds.

Will Lay Mains.—A new dam will be built in the Sandusky river at Tiffin, O., and water mains will be laid soon. A new filter system will also be installed. The public utilities commission has recently granted permission to the Tiffin Waterworks Co., to sell $16,000 worth of 5 per cent bonds and $43,500 worth of 6 per cent cumulative preferred stock, by which payment for the improvements will be made.

(*For complete prices see page* 288.)

Rail Orders

Made Good Showing in July—Car Buying Not So Active

New York, Aug. 3.—Rail orders in July made another good showing and totaled about 242,000 tons according to the records of officially-reported awards compiled by *The Iron Trade Review.* The greater part of the July business was due to the Russian orders which aggregated 160,000 tons. In June, rail orders were 225,000 tons; in May, 140,000 tons; in April, 65,000 tons; in March 160,000 tons; in February 150,000 tons and in January 200,000 tons.

July car orders reached about 9,500, compared with 17,000 in June, 18,000 in May, 1,150 in April, 1,100 in March, 4,000 in February and 2,600 in January. At the present time, the inquiry before equipment builders runs largely to the rebuilding and strengthening of old cars rather than to the purchase of new rolling stock, which probably is of significance in view of the policies of strict economy that have been pursued by the railroads. The Cincinnati, Hamilton & Dayton has placed 500 center constructions with the Haskell & Barker Car Co.; the Chicago & Great Western 500 underframes with the American Car & Foundry Co.; the Gadsden Car Works 600 center constructions with the Mount Vernon Car Mfg. Co. The Buffalo, Rochester & Pittsburgh asks 1,000, and the Maine Central 30 underframes. The Pittsburgh & Lake Erie has placed 20 underframes with the Merchants' Despatch Transportation Co. The Chesapeake & Ohio has placed 50 cabooses with the American Car & Foundry Co., and the Crystal Coal & Coke Co. 50 mine cars with the Pressed Steel Car Co. The Wyoming Coal Co. is out for 50 mine cars and the Iroquois Coal Mining Co. for 50 of the same type. The American Steel & Wire Co. asks 75 to 100 gondolas.

The Russian Government Railways, which have been inquiring for 5,000 tons of railroad spikes and track bolts, apart from the track supplies represented in the recent rail order, have placed this business. The order calls for about 50,000 kegs. The Florida & East Coast railroad has ordered 2,200 tons of rails of the Pennsylvania Steel Co.

Spike Prices Higher

Pittsburgh, Aug. 3.—Buyers of railroad spikes are specifying against contracts more freely. Standard spikes have been advanced by the Jones & Laughlin Steel Co. to 1.45c and small railroad spikes to 1.55c, Pittsburgh.

Still in Doubt

As to Shipments of Ferro-Manganese From England

New York, Aug. 3.—Nothing has taken place to dispel the uncertainty enveloping the shipments to this country of English ferro-manganese, after the tonnage now afloat has been distributed. Representatives of the English works have had no further advices from their principals which throw any light upon the situation. At the present time, the $100 seaboard price for English ferro is purely nominal for while some sellers may accept further business at that level, this is made subject to their ability to ship which in the present uncertain circumstances, means little. Further arrivals under July licenses are noted the past week, including about 3,000 tons by the Malvern range.

Consumers of ferro-manganese, notwithstanding the uncertainty regarding at least early future supplies from England, are not displaying any conspicuous anxiety in the way of new inquiry, for the latter is light. A likely effect of the present situation will be to firm up some of the offers of domestic brands which recently have been at concessions.

Sales at Concessions

Philadelphia, Aug. 3.—Some sales of both domestic and English ferro continue to be made at concessions. Sales of domestic in the Pittsburgh district at $100, delivered, or about $97.50, seaboard, are noted and in farther western territory several hundred tons of English metal now in hand or afloat have been disposed of at about $95, seaboard. A few hundred tons of English also were sold this week at $100, seaboard, the full price.

About 1,000 tons of bessemer ferro-silicon have been taken by eastern Pennsylvania makers and there also have been some transactions in fluor-spar, these including a 100-ton lot for Australia.

Prices Higher at Pittsburgh

Pittsburgh, Aug. 3.—Advances of 50 cents per ton have been made the past week on 10 per cent bessemer ferro-silicon, now quoted at $17, and 10 per cent silvery ferro-silicon, advanced to $16, both for New Straitsville, O., furnace delivery. Demand for both grades, reported to be active, comes principally from the west. The ferro-tungsten market continues to be quoted at $2.50 a pound of contained alloy, Primrose, Pa. Makers of high grade tool steel are still unable to obtain enough of this material to supply their needs. The ferro-manganese market is unchanged and quiet and $100, seaboard, is being adhered to by sellers. Fair activity in the spiegeleisen market is noted and most dealers quote $26, furnace, although this figure probably would be shaded on attractive tonnages. The price of $2.25 a pound of contained vanadium has not entirely disappeared from the ferro-vanadium market, but this product is held generally at $2.30. Ferro-chrome is quoted at 20 cents a pound, Niagara Falls, and nickel at 50 cents a pound.

Ore Shipments

Exceed Those of 1914, But Fall Behind Those of 1913

Cleveland, Aug. 3. — Shipments of Lake Superior ores for July amounted to 7,204,020 tons, compared with 5,784,514 tons in July, 1914, and 8,204,416 in July, 1913. The shipments to Aug. 1 amounted to 18,725,304 tons, compared with 15,408,630 tons to Aug. 1, 1914, and 24,329,460 tons to Aug. 1, 1913. Shipments by ports were as follows:

Port.	July, 1914.	July, 1915.
Escanaba	664,721	813,870
Marquette	297,413	567,359
Ashland	533,744	708,285
Superior	1,956,911	1,286,402
Duluth	1,169,410	2,414,649
Two Harbors	1,162,315	1,413,456
	5,784,514	7,204,021
1915 increase	.....	1,419,507

Port.	To Aug. 1, 1914.	To Aug. 1, 1915.
Escanaba	1,740,741	2,062,700
Marquette	681,361	1,114,360
Ashland	1,416,825	1,870,077
Superior	5,690,413	3,064,002
Duluth	2,949,286	6,710,460
Two Harbors	2,930,004	3,903,704
	15,408,630	18,725,303
1915 increase	.....	3,316,673

Only moderate sales are being made in iron ore and this market has so far shown very little impulse resulting from improvement in other lines. It is estimated that sales of lake ore to eastern furnaces to date amount to about 500,000 tons, with the exception of a tonnage of unknown quantity which has been taken by an eastern Pennsylvania company from an allied steel interest having large ore deposits.

Inquiry for Sheet Bars and Billets

Philadelphia, Aug. 4. (By wire.)—A Cumberland buyer asks for 6,000 tons of sheet bars for first half and 500 tons of billets. Eastern makers are turning down export inquiries for billets because of their sold-up condition. One 3,000-ton inquiry was declined.

For fine finish of grinding where the work is not out of true, 0.003 inch is usually sufficient to true it up nicely if the turned surface is not too rough.

(For complete prices see page 288.)

Billets Scarce

And Mills Are Compelled to Decline Attractive Orders

Pittsburgh, Aug. 3.—Large producers of finished and semi-finished material in eastern Ohio and western Pennsylvania are sold up for the remainder of this year, so far as new business is concerned. This applies to practically all grades and particularly to bessemer and open hearth billets and sheet bars and to wire rods. Large producers say that while small lots of bessemer billets and sheet bars may be bought, it is doubful whether any open hearth material can be obtained in this district. They assert there is no market. It is understood that western mills after this week will stop shipping bessemer and open hearth billets and sheet bars to eastern plants. This is ascribed to the fact that Chicago and other western mills are being rushed to supply their regular trade. Inquiries in this district are large, but sales are few and some excellent orders have been declined the past week, mills being kept busy disposing of obligations on hand, which are sufficient to assure capacity operations for the remainder of the year.

Strong at Youngstown

Youngstown, O., Aug. 3.—The semi-finished steel market continues to display great strength. Valley interests are paying close attention to the open hearth situation in particular, in view of the growing shortage of this material. Producers today stated that $23, Youngstown, represented the market on bessemer billets and sheet bars and $24 on open hearth billets and sheet bars, on spot business. Most mills have covered their customers for the third quarter at prices under these levels. On future business, considerable advances are being asked, and producers are reluctant to book far ahead. The Youngstown Sheet & Tube Co. recently sold 10,000 tons of bessemer billets to a Canadian interest.

Order Books Filled

Philadelphia, Aug. 3. — Considerable doubt as to what actually represents the market for open hearth billets, exists in this territory, since the makers who usually have a good tonnage to sell are so filled on orders that they can accept nothing but small lots. Sales of this size of ordinary open hearth rolling billets are noted at $28 to $30, Philadelphia, and forging billets have been taken by consumers at $35, Philadelphia. Special forging billets have commanded as high as $38, eastern Pennsylvania mill.

Plant Extensions

For War Purposes Call for 17,000 Tons—Awards Not Numerous

Philadelphia, Aug. 3.—An award of 6,000 tons of steel additional to the McClintic-Marshall Co. by the Baldwin Locomotive Works for extensions of its Eddystone, Pa., plant, to be used in the manufacture of war munitions, increased the total let for these purposes to 17,000 tons. The steel work for the original sections awarded two and one-half months ago, has been completely erected in record time. Other important extensions of war order plants, ship yards, etc., are in view in this territory. Eastern Pennsylvania shape mills are maintaining full operations largely by reason of heavy specifications against old contracts. New business is increasing, but is only of fair tonnage. Current prices show greater uniformity at 1.30c, Pittsburgh, or 1.459c, Philadelphia, but it still is reported that large buyers can cover through the fourth quarter at concessions.

Position is Stronger

New York, Aug. 2.—Small sales of standard shapes have been made by eastern Pennsylvania makers in this territory at 1.35c, Pittsburgh basis, or 1.519c, New York, though these are exceptional. The usual price is 1.30c, Pittsburgh, but there still persists talk that lower quotations creep in where the tonnage is large and very desirable. It may be stated as a fact, however, that the position of the shape mills, including those in eastern Pennsylvania, is one of increasing strength. The Bethlehem Steel Co. continues at double turn and the other mills are running practically full. Most of these mill orders are against tonnage previously booked, although the current run of new business is very fair, especially in smaller jobs. Deliveries continue at about three weeks from eastern mills. Large single jobs are not very numerous, but the miscellaneous tonnage is better.

Prices May Go Up

Pittsburgh, Aug. 3.—A great deal of small structural jobs has been let the past week and numerous moderate inquiries are pending. Prices for material, however, are not in proportion to the activity of the larger mills, which are running near to maximum rate. When smaller mills become filled, a situation expected to develop soon, higher prices are said to be probable. The Jones & Laughlin Steel Co. contract for the city-county building, Pittsburgh, involved $192,965, instead of $113,965, as was reported last week. This company has taken 1,000 tons for an addition to The Bulletin building, Philadelphia; the American Bridge Co. has been awarded 2,500 tons by the Shelby Steel Tube Co., at Ellwood City, Pa.; the McClintic-Marshall Co. has taken 2,000 tons for an extension to the open hearth plant of the Republic Iron & Steel Co., Youngstown, O.; the Fort Pitt Bridge Co. has been awarded 1,700 tons of bridge material for the Pennsylvania railroad and 330 tons for the Baltimore & Ohio railroad and the Riter-Conley Mfg. Co. has taken 1,100 tons for the municipal building at Detroit and 150 tons for a crane runway for the General Electric Co., Erie, Pa.

Shapes are Firm

Chicago, Aug. 3. — Structural shapes remain firm and in good demand, with considerable business coming out from week to week in the west. Fabricating shops have considerable business in hand and car shops also are specifying well. Of projects closed in the west recently, the largest consists of two bridges in San Joaquin county, Cal., aggregating 868 tons, which was taken by the American Bridge Co. Shapes are steady at 1.49c, Chicago.

CONTRACTS AWARDED.

Hotel Des Artestes, Sixty-seventh street, New York City, 1,000 tons, to the Passaic Structural Steel Co.

Balch-Price store, Brooklyn, 650 tons to Milliken Bros., Inc.

Apartment for the Fullerton-Weaver Construction Co., East Forty-seventh street, New York City, 1,800 tons to the Henkel Iron Works.

Old and Middle river bridges for San Joaquin county, Cal., 868 tons, to American Bridge Co

Bank and mercantile building for Union Trust Co., South Bend, Ind., 410 tons, to Kenwood Bridge Co.

Addition to the Breakers apartment building, Chicago, 219 tons, to Gage Structural Steel Co.

Repair material for five through truss spans for Frisco railroad, St. Louis, 190 tons, to Virginia Bridge & Iron Co.

Various buildings for B. & O. Terminal Railway Co., Chicago, 149 tons, to American Bridge Co.

Further extensions of plant of Baldwin Locomotive Works, Eddystone, Pa., 6,000 tons to the McClintic Marshall Co.

Bridge near Erie, Pa., for Pennsylvania railroad, 320 tons to the McClintic-Marshall Co.

Addition to The Bulletin building, Philadelphia, 1,000 tons, awarded to the Jones & Laughlin Steel Co.

Shelby Steel Tube Co., Ellwood City, Pa., 2,500 tons, awarded to the American Bridge Co.

Extension to the open-hearth plant of the Republic Iron & Steel Co., Youngstown, 2,000 tons, awarded to the McClintic-Marshall Co.,

Municipal building at Detroit, 1,100 tons, to the Riter-Conley Mfg. Co.

CONTRACTS PENDING.

Bridges at various locations for Pennsylvania railroad, 730 tons. Bids taken.

Section No. 2 of the Eastern Parkway subway line, Brooklyn, 5,700 tons, Dock Contractor Co., low bidder.

Section No. 3 of the Broadway-Fourth avenue subway line, New York City, 6,300 tons, Holbrook, Cabot & Rollins Corporation, low bidder.

Section No. 3 of the Eastern Parkway subway line, Brooklyn, 11,650 tons, Rogers & Hagerty, Inc., low bidders.

Third tracking of Myrtle avenue elevated railroad, Brooklyn, of New York Municipal Railway, 4,200 tons, Phoenix Bridge Co. low bidder and expected to receive award.

Pier, Panama Canal, 1,600 tons, Pennsylvania Steel Co. low bidder.

Building for the Chandler Motor Car Co., Cleveland, 250 to 300 tons.

Bridge work for Chesapeake & Ohio railroad 600 tons. Bids being taken.

Bridges at Cambria street and Whitney avenue for City of Philadelphia, 500 tons, bids being taken.

Bridges for Philadelphia & Reading railroad at Milton, Pa., 1,600 tons, Pennsylvania Steel Co. low bidder.

Substructure for municipal pier at McKean street, Philadelphia, 600 tons, bids to be taken Aug. 9.

(*For complete prices see page* 288.)

Coke Market

Is Only Fairly Strong—Surplus in Connellsville Region

Pittsburgh, Aug. 3.—The coke market is only fairly strong. The fact that the Connellsville region last week was confronted with a surplus and a diminished demand had a slightly bearish tendency. According to the *Connellsville Courier,* the production was 367,095 tons, a decrease of 4,049 tons for the previous week. Demand is moderate, but with the pronounced improvement in the pig iron market, better inquiries and contracts may be expected. Spot furnace is still quoted at $1.65 to $1.80; furnace contract $1.75 to $1.80; prompt foundry $2 to $2.50 and foundry contract $2.50 to $2.60.

Coke Firmer

Cincinnati, Aug. 2.—Coke prices are a little firmer, due to the large consumption and heavy shipments on old contracts. Most furnaces and foundries in this territory have purchased for several months' or a year's requirements, and new sales are scarce. A general advance of 25 cents a ton has been made on Wise county, Pocahontas and New River furnace and foundry grades.

Sluggish at St. Louis

St. Louis. Aug. 2.—Coke is dull and sluggish. Connellsville and Virginia 72-hour foundry grades are held at $2.50 to $2.75.

President Harry Coulby, of the Pittsburgh Steamship Co., Cleveland, received painful but not serious injuries about the head in an automobile accident Aug. 2, while driving to the city from his home at Wickliffe, O.

Scrap Market is Excited

By Brokers in New York—General Trend of the Market is Upward in Other Centers

New York, Aug. 2.—Brokers are responsible for considerable excitement in the old material market by the high bids which they are offering, especially for heavy melting steel. These middlemen have bid as high as $11.15, New York, for steel, or $12.75, delivered at the plant of a large eastern Pennsylvania steelmaker who usually is not an important buyer of this grade, but now is negotiating. Some high prices also have been offered by the brokers for Roebling, N. J., delivery. These are the highest prices for steel that yet have appeared in the New York market and it is not clear whether they are based upon actual orders or speculation. The consumers' market on steel is regarded as $12.50 to $13, eastern Pennsylvania. In general, the old material market is spotted and somewhat erratic. The demand is not evenly distributed. Cast and wrought are in good demand usually at a little better price.

Upward Swing

Philadelphia, Aug. 3.—A more pronounced upward swing of prices has marked the old material situation in this district the past few days and quotations are up 50 cents on the average under a well-distributed buying and under some speculative activity by brokers. Buyers are not finding it so easy to get tonnage since offerings are limited. On the Pennsylvania railroad's July offering closing this week the bids were fully $1 higher than a month previously. Heavy melting steel has been sold at $13, delivered, eastern Pennsylvania, though not in large quantities. For No. 1 railroad wrought $14, delivered, is obtainable, with reports of $14.25 having been done. No. 1 forge is up decidedly and sales today were made at $10.25, delivered. No award yet has been made of the 26,000 tons of Panama scrap recently bid upon.

Market Improved

Pittsburgh, Aug. 3.—Improvement has been shown the past week in the scrap market. The heavy melting material situation has been bettered following the lifting of the embargo against the Pittsburgh Steel Co. Prices on this grade have been established at $12 to $12.50, Pittsburgh. Mills are purchasing No. 1 wrought more freely and this grade has been advanced to $11.25. Machine shop turnings, cast borings and old car wheels are in fair demand. Low phosphorus material shows only ordinary strength at $15.50 to $16.

Strength Develops Suddenly

Cleveland, Aug. 4.—Sudden strength has developed in the iron and steel scrap market, following months of uncertainty and weakness from the standpoint of prices. Quotations for all grades of material are up from 25 cents to $1 a ton. Heavy melting steel, for instance, is quotable $11.25 to $11.50 a gross ton, as against $10.25 to $10.72 a few days ago. The improvement is due rather to better sentiment among the dealers and speculation for the rise, than to active demand from mill consumers, although dealers say the situation is growing better in this respect. The same conditions hold true in the valleys. Heavy melting steel is quoted $12 to $12.25, Youngstown. Machine shop turnings and cast scrap are weak at both centers.

Dealers Optimistic

Cincinnati, Aug. 2.—Dealers of iron and steel scrap are very optimistic, and expect an advance in prices in the near future. Recent advances in pig iron and finished materials have given the market a good tone, as old materials usually follow higher quotations on these two, especially pig iron. Shipments to rolling mills continue good, and new sales are better. Prices are unchanged. The best sellers during the past few days have been No. 1 busheling, heavy melting scrap, No. 1 machine cast, and bundled sheet scrap.

Advances by Leaps

Chicago, Aug. 3.—Scrap prices, particularly in the heavy steel grades, are advancing steadily and much distance separates the present level from that prevailing a short time ago. Prices at present are not as firm as was the case late last week when a buying flurry gave strength, and its subsidence has caused weakening.

Heavy melting steel is quotable at $11.50 to $11.75 per gross ton, and some dealers have been holding at $12, though transactions at that level have not come to light. Considerable buying has been done and mostly at the figure named at the present level. This price is approaching the local quotation on pig iron and the spread is narrower than usual between these products. Shoveling steel, rerolling rails and wrought grades also have advanced sharply on the buying, but are easier at present.

Railroads have considerable tonnages before the trade for assimilation and conditions are much better now than a short time ago for its reception. The Baltimore & Ohio offers 10,000 tons, much of which, of course, will not come to this market. Included in this list is 1,000 tons each of steel rails, heavy melting steel and car wheels. The Belt Railway of Chicago offers 500 tons, the North-Western 4,600 tons, including 1,000 tons of No. 1 wrought and the Santa Fe offers 2,400 tons.

Prices Advanced

St. Louis, July 31.—The scrap market is firmer, and prices have advanced on nearly all articles. Railroad offerings since July 1 have been very light, and there seems to be a decided shortage in heavy melting steel and rerolling rails. The only railroad offerings out this week is an open list from the New York Central and a small list of 500 tons from the Vandalia.

(For complete prices see page 288.)

Demand for Wire

Is Still Active and Heavy Fall Business Expected

Cleveland, Aug. 3.—Wire mills in the Cleveland district continue to operate very actively and the market is in highly satisfactory condition. The demand for flat wire has been so strong that the leading maker is virtually out of the market. This wire is being extensively used in the manufacture of bedsteads and other articles in which seamless tubes were formerly used exclusively.

Fair Demand for Wire Products

Pittsburgh, Aug. 3.—Demand for wire products is fair and prices are unchanged. A seasonable quietness on wire nails, quoted at $1.60 per keg, base, Pittsburgh, is prevailing. Manufacturers are waiting for the opening of the fall season and think it will be marked by an extremely large domestic demand. Export demand for nails is heavy and is so extremely strong for barb wire that inquiries are being turned down by most mills. Plain wire is quoted at $1.40 and galvanized wire at $2.20, Pittsburgh.

Francis J. Robinson, superintendent of R. Estabrook's Sons' Iron Foundry, South Boston, died at the Massachusetts Homeopathic hospital, Boston, on July 26, following an operation. Mr. Robinson was 63 years of age and had been in the iron casting business since boyhood.

Rush of Inquiry

Comes From Melters in the Pittsburgh District

Pittsburgh, Aug. 4. (By wire.) — Aroused by the heavy demand for all grades of pig iron and the upward trend of prices, numerous buyers are making inquiry by telegraph and telephone, as well as by mail, of sellers in this district in an effort to cover requirements. Quantities involved range from a few hundred to 6,000 tons. Some large makers are refusing to quote at all, others are naming levels for prompt delivery only, and those quoting for last half delivery are asking pronounced advances over figures which have been prevailing. Fair sized sales for prompt and last half shipment have been made. In rare instances, sellers are quoting on first half delivery, but are demanding prices which at present are considered prohibitive. Sellers assert that a pig iron boom of such proportions as the trade has never seen is getting under way. They are predicting that fancy prices will be established in the not distant future. One seller, who did not want the business, is understood to have quoted $17, valley, for basic iron for first half delivery. Bessemer iron for prompt shipment is quoted firmly at $14.50, valley. A large producer today declined an order for 6,000 tons of this grade at that figure and for that delivery. This seller also refused an order for 4,000 tons of bessemer at $14.50, valley, for export.

At the office of the Carnegie Steel Co., denial was made today of the report that orders have been given to relight its blast furnace at Niles, O., and at Zanesville, O. It was explained that before either of these stacks is blown in, the company's furnaces at Columbus, O., would be ordered in. Instructions were given one month ago to put the Columbus furnaces in shape, but none has been given to relight them.

John Parker, machine designer, for 22 years engineer in charge of designing milling machines for the Brown & Sharpe Mfg. Co., Providence, R. I., died at his home in that city July 23, aged 51 years. Practically all of his life was devoted to designing and supervising the construction of machinery. He entered the employ of the Brown & Sharpe Mfg. Co. in 1891. Mr. Parker's greatest achievement was in developing the constant speed drive milling machine and adapting this method of driving to a complete line of machines built by the company. He was a member of the American Society of Mechanical Engineers.

Fluorspar

Production and Imports Affected by Depression in Steel

A bulletin on fluorspar by Ernest F. Burchard has just been published by the United States geological survey.

The market for the bulk of the fluorspar sold in the United States depends on the steel industry, and when that industry becomes depressed the demand for fluorspar quickly diminishes. Gravel spar is consumed as a flux in basic open hearth steel furnaces and to a smaller extent in other metallurgical operations. In 1913 the marketed production of gravel spar constituted about 88 per cent of the total marketed output of domestic fluorspar; in 1914 it constituted about 83.3 per cent. The reduction in quantity of gravel spar sold in 1914 as compared with 1913 was 22.1 per cent, which is of interest in view of the decrease in output of basic open hearth steel.

The total quantity of domestic fluorspar reported to the survey as marketed in 1914 was 95,116 short tons, valued at $570,041, as compared with 115,580 short tons, valued at $736,286, marketed in 1913, a decrease in quantity of 20,464 short tons and in value of $166,245. This decrease represents 17.7 per cent of the quantity and about 22.5 per cent of the value of the product marketed in 1913. The average price per ton for the whole country, considering all grades of fluorspar—gravel, lump and ground—was approximately $5.99 in 1914, as compared with $6.37 in 1913, a decrease of 38 cents a ton, or about 5.97 per cent. This value represents the selling price on board cars or barges at railroad or water shipping points; and, with reference to the product from Colorado, New Mexico and New Hampshire, the price reported for much of the spar includes the cost of a long wagon haul—$1.50 to $3 a ton. In Illinois the principal producing mines are near river transportation and many of the mines reporting from Kentucky are near a railroad, so that the cost of long wagon hauls has not entered to an important extent into the reported value of the fluorspar from those states.

More Activity

In Plants in Steubenville District—Furnaces Blown In

Steubenville, O., Aug. 3. — La Belle Iron Works, this city, is relining its No. 2 blast furnace and will blow it in about Sept. 15. Its other stack, No. 1, is operating and is producing basic iron, the grade that will be produced by No. 2. The latter had the distinction of having been in blast continuously for four years and 10 months before it was blown out for relining. No. 1 has been in blast for four years and six months. The shortest time that either of these furnaces was in blast during the past 12 years was three years and six months, No. 2 having been in operation the shorter period. Both furnaces have averaged better than 400 tons of iron a day.

Of its 11 open hearth furnaces, the company has 10 in operation, finding a heavy demand, in common with other plants in the country, for open hearth steel. All four of the wrought pipe furnaces are kept busy, and are operating at 95 per cent capacity. Oil country and line pipe are the principal grades which are being produced. Mills making black sheets are operating at 75 per cent capacity. The plant also is kept busy making galvanized pipe.

A trip through the company's works not only impresses the visitor because it is busy and up-to-date, but also because the precautions taken to safeguard against accidents. No plant in the country has a finer atmospheric cooling system for the benefit of its workmen than La Belle, and to this is attributed the fact that not a single case of exhaustion of employes while at work has occurred. When the extremely hot days which have prevailed this summer are considered, this condition is appreciated as being unusual. The safety first program has been taken up vigorously. In addition to safety devices used on machinery to prevent injury to workmen, the company has done away entirely with ladders and has substituted steps to insure safety for workmen. Accidents at the plant have decreased 25 per cent this year, as compared with the same period of last year.

At Benwood, W. Va., the Wheeling Steel & Iron Co. is operating its steel works at capacity, producing bessemer billets. Its tube mills there are also running at a high rate. Its blast furnaces at Martin's Ferry, O., and North Wheeling, W. Va., are on, but the one at the Belmont works, idle for four years, still is out of blast.

Value of Specialization in Factory

Results Obtained on a Wide Range of Work by Considering Both Workmen and Machines as Specialists

BY ALBERT A. DOWD

MANY factors contribute to the success or failure of any organization. One of the most important is the question of distributing the work so that each man has his part to do and does it to the best advantage.

This is the age of specialization, and it is found in all branches of work. Where years ago *all-around mechanics* were found in every factory in large numbers, at present there are few of this class. For example, the mechanic of years ago could be put on anything, especially if he were fitted to be a good first-class toolmaker. He could select his stock, forge a tool, harden it and put it in shape in every way ready to do the work desired. He was as much at home on a milling machine as on a lathe, and at a pinch, could be placed on any of the other machines in the factory, planers, shapers, gear cutters, or any other type of machine.

A good draftsman years ago could be put on almost any kind of designing with the assurance that he could be left alone and would proportion his parts correctly without requiring excessive supervision. In the pattern shop, and in various other departments of the factory the same conditions of general efficiency obtained. All-around men now are more and more of a rarety and there is a reason for this condition. The requirements of modern factories are different from those of a few years back. Special machinery has been developed to a considerable extent in many lines unthought of years ago. The modern machine, too, of any type is likewise much changed from its remote ancestors. The speeds and feeds used at present would cause a mechanic of 40 years ago to stand aghast fearing destruction of both machine and cutting tool. The present age is so familiar with these developments that their significance is not realized.

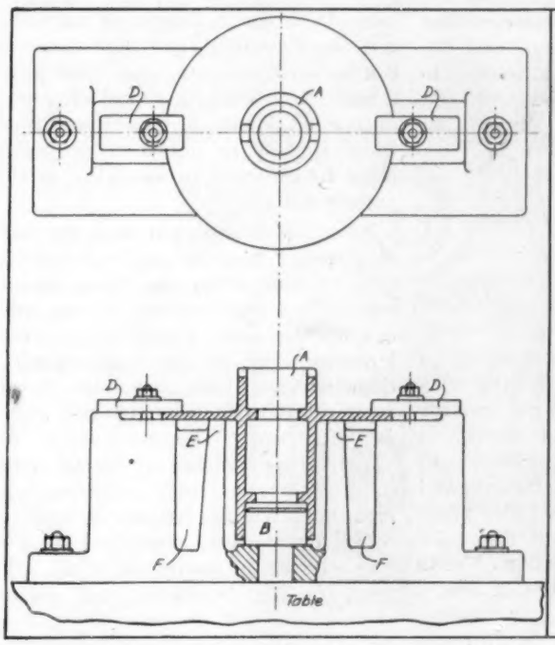


FIG. 1—MILLING FIXTURE DESIGN, BY DRAFTSMAN UNFAMILIAR WITH TOOL WORK

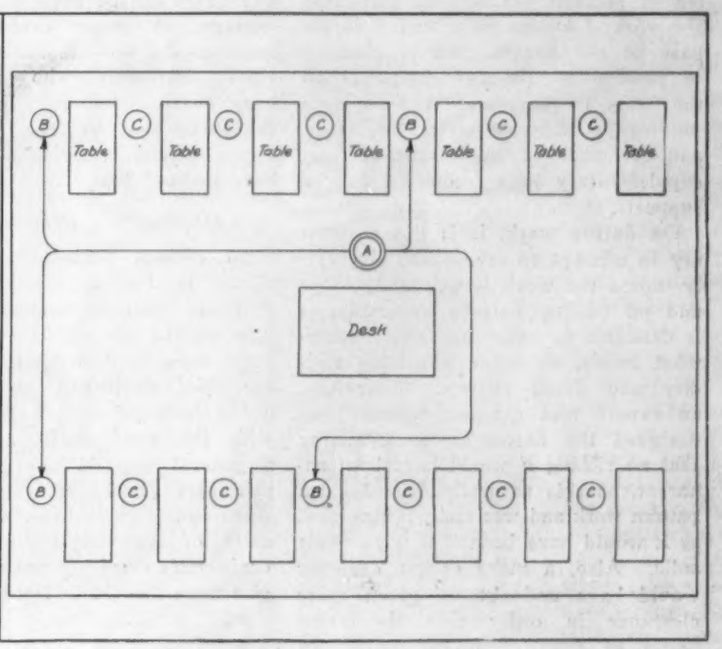


FIG. 2—DRAFTING ROOM LAID OUT TO SECURE EFFICIENT OPERATION

Machines Are Specialists

Very many of these changes are largely due to specialization in various branches of work. In order, therefore, to keep up with the times, each manufacturer of the present day should realize that the *machines* are *specialists,* and should employ men to run them who are specialists. Throughout the various departments, the same application of the rule may be made according to the conditions which are to be met in the work to be done. To the manufacturer who has not realized this condition, let us appeal directly, to analyze first the conditions in his own factory in order that he may understand the necessity for application of new methods. Assuming a condition of this kind, let us take up the matter step by step and make notes of the progress which can be made by the aid of specialization in various factory departments. Starting with the drafting room, we find that 25 men are indiscriminately placed on jig and fixture work when required, with the result that some of the men who are good designers on certain classes of work are not at home on the other class. As a natural consequence, the work suffers and is produced at a much slower rate. Although a chief tool designer may be in charge of the work, he can depend very little upon his men except on general features. On account of their unfamiliarity with the work, they are naturally slow and are not well up in details which pertain to manufacturing work. For example, let us take the milling fixture shown in Fig. 1. This was designed by a man who was a competent de-

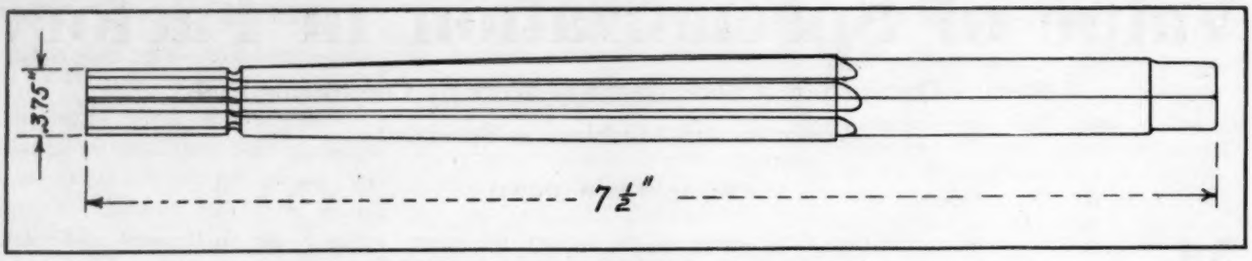


FIG. 3—REAMER MADE BY SPECIALIST IN LESS THAN FOUR HOURS

signer on other lines of work, and who was temporarily switched off onto tool work in order to help out in an emergency.

Undoubtedly the fixture as shown would do the work, but unprofitably, for the reason first, that it is too light, and second, that it is not readily handled or cleaned. It will be seen that the work *A* locates on a stud *B* in the base of the fixture, and is clamped in position by the two straps *D* on the flange of the work. The supporting lugs at *E* come under the flange, and the ends of the straps rest on supplementary lugs connected to the supports.

On fixture work, it is not customary to attempt to save material greatly unless the work is extremely large and on milling fixtures especially, it is desirable to keep the fixture somewhat heavy, in order to obtain rigidity and avoid chatter. Therefore, an expert tool designer would have designed the fixture in such a way that no ribbing *F* would have been apparent, as this naturally caused extra pattern work and was really not as good as it would have been if it were made solid. Also, a more expert designer would have undoubtedly given more clearance in order that the chips might be removed more easily. In all probability, he would not have spent over four or five hours in designing the fixture complete, whereas the other draftsman spent over a day in the design and then had not put on dimensions. In addition to this, the chief tool designer had certain changes made which took several hours longer, so that when the fixture was completed, the time consumed in its design had been about three times as much as it should have been. In other lines in the drafting room, the features of specialization can be utilized to good advantage. A proper organization has much to do with its success, and the chief draftsman who attempts to keep every detail in mind will find eventually that he has many of the minor details while the larger ones have escaped him.

Organizing a Drafting Room

An efficient organization scheme is shown in Fig. 2, where the draftsmen are grouped under experienced men on the various classes of work. Each man is directly responsible to the chief draftsman, while the men under him do not come in contact with the chief draftsman except in a general way. An organization of this sort proves very efficient and saves considerable time. It also takes much of the weight from the chief draftsman's shoulders and allows him to give more thought to features of design.

Fig. 2 shows the chief draftsman *A* with his various sub-foremen at *B*. Each of these sub-foremen has a group of two or three men, *C*, under him. It also must be remembered that the sub-foremen are working foremen also, and while a certain amount of available time is necessarily spent with their workmen, they are still able to turn out considerable work themselves. Therefore, they can not be considered as non-producers.

In the pattern shop, we find many opportunities for advancing specialization. Invariably some of the workmen are more rapid than others. It also will be found that many of the men are more particular about their work than others. A man who is extremely rapid may not be found as accurate in his work as some of the slower workmen, but nevertheless he may be profitably employed on certain classes of work and prove more efficient than a slower workman. In patterns for jig and fixture work, for example, a great degree of accuracy is seldom required, and here the men can be used who are most rapid even though their work is somewhat lower in general standard than the others. Thus it will be found a profitable thing to endeavor to specialize in the pattern shop.

Now let us step out into the factory itself. A great deal is said from time to time about the non-producer, especially a sub-foreman or man who can do the work himself if required. However, one of the best organizations which I have ever seen, maintains sub-foremen, who are also working foremen. The department devoted to the building of special tools, fixtures, etc., naturally requires foremen who are thoroughly competent to fill positions as specialists on certain classes of work, such as lathe men, milling machine men, fitters, toolmakers, and so on. These various specialists may have men under them who are also specialists, but perhaps in not as great a degree. Their lathe hands may be clever men on other lines of work, as for instance the milling machine, planer or shaper, and yet they may be especially good

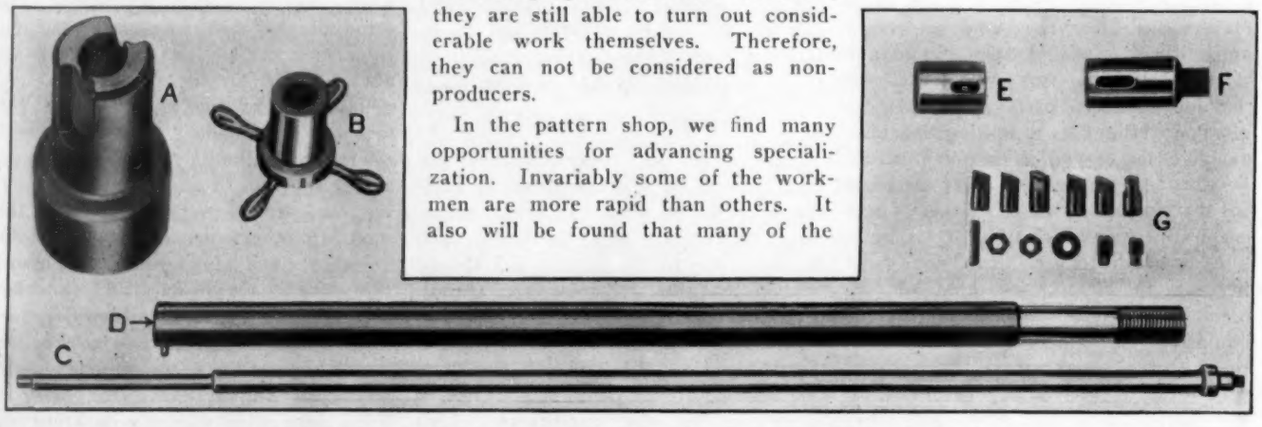


FIG. 4—SPECIAL TYPE OF CHUCK FOR HOLDING AUTOMOBILE PISTONS

when it comes to the engine lathe. These foremen being specialists in their own line, naturally employ men under them who are also exceptionally good workmen on the machines over which they have charge. In many cases, the men have been "brought up" on the type of machine on which they are doing the work. As a natural consequence, they are perfectly familiar with every aspect of the machine and understand how to get the most out of it in the line of production. In setting up the work they have bolts, straps, etc., conveniently placed so that they are readily obtainable for any special work.

In the tool department devoted principally to the manufacture of special tools, fixtures, jigs, etc., the specialist's work is particularly noticeable. The foreman of the department separates his men into gangs each under a separate foreman. These gangs are grouped with their different machines such as lathes, planers, shapers, milling machines, etc. When the work is put through on the contract or premium system, it is usually handed to the foreman with a price specified for the particular piece of work. The foreman in his turn gives the work to one of his men who is especially suited to that class of work. It may be that the work is not to be done entirely by this particular foreman, and in a case of this kind he is simply prepared to do the line of work to which his machines are suited.

In the case of special tools, such as reamers, counterbores, and work of similar nature, it often happens that one man may be selected to carry a tool completely through. If this is the case, he may be required to operate on two or more machines in order to complete the work. There is, however, no disadvantage in this providing the man understands the manufacture of the tool to which he is giving his attention. An excellent example of the value of specialization as applied to a piece of work of this sort is illustrated in Fig. 3. There was a rush job on the single reamer shown in Fig. 3. This reamer was to be made up as rapidly as possible for some special work which was then in process in the factory. It will be noted by reference to the illustration that the reamer is somewhat long for its diameter, and as a consequence is rather fragile and difficult to hold in the machining operation without springing. As the work was being done on the premium system, a price was to be set before the piece was put into the shop to be made. The estimator judged that it would require seven or eight hours work to complete the reamer ready for hardening. But in order to check himself, he consulted the chief toolmaker, asking him about how long he considered it would take to make the reamer. The chief toolmaker said he guessed about a day's work or so. As this amount of time seemed rather too much to the estimator, he spoke to one of the workmen, an exceptionally good toolmaker, and this man seemed to think about a day and a half of work would be required.

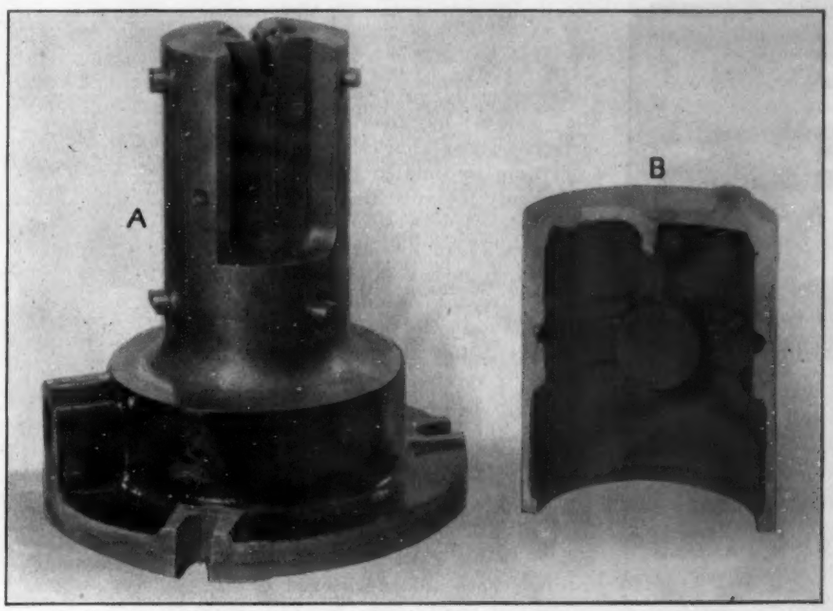


FIG. 5—CHUCK ADAPTED FOR VERTICAL MACHINE

It so happened that one of the men in the factory was especially good on small tool work, and he had charge of the lathe work in this department. The proposition therefore was put up to him. He thought he could do the job for two dollars and make money on it. As his rate was about 40 cents an hour, this would mean about five hours labor. The job was finally turned over to this specialist with an allowance of five hours on it. It was completely finished, backed off ready for hardening, in a trifle less than four hours. This was exceptionally good time for a piece of work of this kind, and had not the workman been a specialist on this line of work, it would undoubtedly have taken at least twice as long to complete the reamer.

Probably in no other department is the value of specialization more apparent than in that devoted to the building of special tools, jigs and fixtures. The writer has in the past few years been connected with several factories in which work of this character has been handled by different methods. One method is to employ specialists, such as milling machine operators or lathe hands in various departments, routing the work to them in the process of manufacture. The object of handling the work in this way is to take advantage of the cheaper rates which some of these men receive, in preference to allowing a toolmaker at his higher rate of pay to do all of the work.

This argument looks very reasonable, but on examination a few weak points are apparent; each man to whom the work goes must familiarize himself with the blue print before he can start the work and must also procure his tools and arrange the method of holding the piece while machining. The only supervision which he has is the foreman of the department, who only knows in a general way the requirements of the work, so that it may be produced within the desired limits of accuracy or it may be machined in such shape that additional work has to be done on it after it reaches the toolmaker. There is also the possibility of an accumulation of errors caused by several workmen using different surfaces to locate the piece from when machining. Finally, when the various parts are received by the toolmaker he finds it necessary to do about three times as much fitting as should be required.

In the building of special tools in a department devoted to this work, one of the first requirements is a

well lighted tool room having machine tools which are strictly up-to-date and a tool crib with an exceptionally good assortment of tools. Another important feature is the upkeep of the machine tools themselves. If these become out of alignment they will not produce accurate work and therefore cannot be considered thoroughly efficient. In this department all the men may be considered specialists; some on fixture work, some on milling cutters and small tools, some on planer or shaper work, etc.

The premium system is in vogue in this department, prices being based on the previously estimated cost of tools or fixtures. These prices are given to the foreman of the entire department and he pieces jobs out to

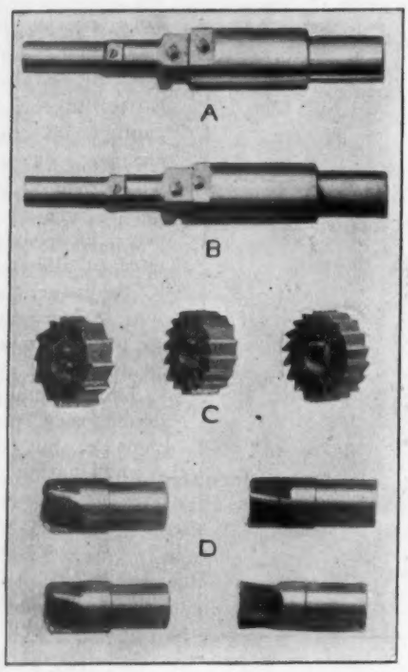


FIG. 6—SMALL TOOLS PRODUCED RAPIDLY BY SPECIALIST

his sub-foremen, giving each piece to one of these who is most efficient on that kind of work. In the case of a jig or fixture having a number of parts, the work is turned over to the sub-foreman of this "gang", who may be termed the head toolmaker, he in his turn giving the job complete to one of his men. If planing or milling is to be done, this toolmaker gives the work to one of the other sub-foremen on this kind of work with suitable instructions as to the accuracy required, working points, etc. Small parts such as special screws or clamps are given to another sub-foreman with the necessary instruction. All the work while in process is practically under the supervision of the toolmaker to whom it has been given, so that when the various parts are complete and turned in to him, very little fitting is necessary. For small parts such as bushings, pins and other light pieces, a small hand screw machine is frequently employed if the number to be made is large enough to warrant its use. Each man under this system has the incentive of the premium he will receive if his work is done in the alloted time.

This method has proved very efficient and the tools produced are exceptionally well finished and accurate. The prices at which the work is done are also more reasonable than under any other method known to the writer. A few examples of the work produced under the two methods are here given and will be useful in forming comparisons and showing the value of specialization.

Making Special Chucks

Fig. 4 shows a special type of chuck made specially for holding automobile pistons by the interior cored surface. These chucks were made up from time to time to go with special equipment for machining a piston. The body, *A* is a steel forging, ranging from 11 to 14 inches in length, by 5 or 6 inches in diameter. The piece *B* is the operating spider used in connection with the sleeve, *D*. This sleeve is drilled throughout its entire length to receive the operating rod, *C*, and both pieces pass entirely through the spindle of the machine. The cams *F* and *E* have three slots cut on an angle to receive the dovetailed pin at *G*, which set into the body of the chuck and grip the piston by the inside. All working parts are carefully hardened and ground to size.

The first one of these chucks required 245 hours to complete, partly because it was a new type of device and the workmen were unfamiliar with its requirements. The second chuck was made in a little shorter time and the third still better. About this time, these chucks began to come along more rapidly and it was found profitable to let one man do most of the work, giving him a helper who was an apprentice boy in his third year. The apprentice took the rough forging and did all the turning and boring on it, threading the large end and fitting it to the spindle. The long sleeve *D* was done on a gun barrel drilling machine in another department, but aside from this, all the other work was done in the tool department itself. The final result of putting one man on this work was that he soon learned its requirements and peculiarities, and it was not exceptional for him to produce a chuck complete in from 100 to 120 hours. This particular case shows how a progressive toolmaker or workman can gain in production when on the same class of work from day to day. This is specialization of a kind which can be used in any factory to good advantage.

Fig. 5 shows another chuck of somewhat similar construction as far as its internal arrangements are concerned, but adapted to a vertical, instead of a horizontal machine, so that it requires no long operating rod or sleeve. The base *A* is bolted to the table of the machine instead of being screwed to the spindle and the body of the fixture is gray iron instead of steel. A piston *B* has been sawed longitudinally in order to show the advantages of this method of holding by keeping the walls of the casting of

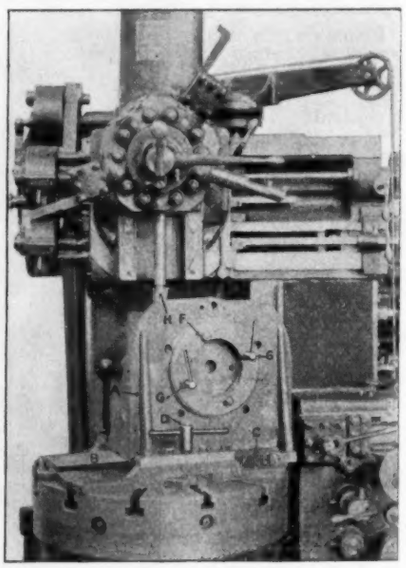


FIG. 7—SPECIAL SLIDING AND INDEXING FIXTURE

uniform thickness. This chuck took approximately 275 hours to make and yet there was less labor on it than on that shown in Fig. 4. In addition, the body was cast iron and could be machined more readily. On the other hand, several men were employed in its construction and while these men were good workmen they had not the advantages of having produced a large number of devices of this kind. Undoubtedly the same chuck could have been built complete by the specialist in 80 or 90 hours.

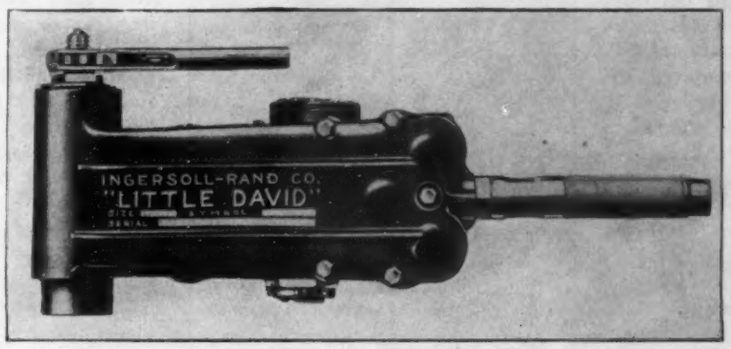
Small tools, boring bars, cutters, counterbores, etc., can be very profitably handled by specialization. In every factory there are numerous tools of these types. By giving this class of work to the more efficient men, a distinct gain in production will result. Fig. 6 shows a group of special tools

produced by these methods, the time of production being excellent. The boring bars *A* and *B* are about 20 inches long with a large diameter of 3¾ inches and are low grade tool steel. The bars were for turret tool equipment and were received in small lots, no two being exactly alike, although of similar construction. An exceptionally rapid workman was used on this work and turned out bars with cutters fitted already for grinding, in from 14 to 16 hours labor. The milling cutters *C* are high speed steel and are uniformly made in from 24 to 26 hours each. The diameters vary from 3 to 4½ inches. The shell drills *D* are of the hollow type, piloted on an arbor when at work. The same workman made these drills in from 12 to 14 hours each.

It is obvious that when several tools of the same general type are to be made at the same time, a much shorter time will be necessary because the workman can combine the operations and save considerable time in setting up. A thorough familiarity with tools in the tool crib and an excellent knowledge of table settings on the universal milling machine, made this man an exceptionally good operator on this class of work.

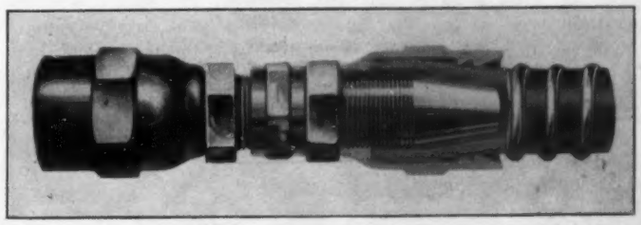
Fig. 7 shows a special sliding and indexing fixture designed for use on a vertical boring mill. This fixture was exceptionally heavy, weighing nearly one-half ton and required very careful work to produce so that it would be within the required limits of accuracy. The fixture consists of a base, *B*, on which the indexing portion, *A*, slides. On account of the weight of the fixture, the rack *C* was cut along the side of the sliding member and was operated through a pinion controlled by the wrench *D*. Indexing pins give the correct transverse location. The indexing portion of the fixture with the work clamped in place, is on the opposite side from that shown in the illustration. The reamer *H*, however, indicates its location. The ring *F* is used for clamping when in the correct index position, the two studs *G* being used for this purpose.

The work on this piece was produced by the specialization method under the direct charge of the toolmaker. Small parts such as studs, clamping handles, etc., were made in the screw department by a man used to handling short jobs. In the planing department, pieces *A* and *B* were finished to require little fitting. The indexing parts were turned and bored on the boring mill to the required accuracy. All the fitting of the slides was done by men constantly employed on this class of work. The final assembling and fitting was done by the toolmaker who supervised the work. To this man naturally all the careful work regarding the indexing points, bushings, etc., was left, and on him a great proportion of the accuracy depended. On account of the careful supervision and accurate workmanship on this important piece of work it was turned out in a minimum amount of time and to a nice degree of accuracy.



PNEUMATIC DRILL FOR CLOSE QUARTER DRILLING, REAMING, TAPPING, ETC.

Many other examples could be given which would show the value of specialization in the factory. Those given however, are specific cases which have come to the attention of the writer. To the manufacturer who does not specialize, the cases cited will be sufficient to show its value. In this age of progress, the man who does not specialize will certainly fall behind in the race for success.



NEW HOSE COUPLING

Close Quarter Drill

A portable drill adapted for work in confined positions where lack of space does not permit the use of the regular reciprocating pneumatic type, has been developed by the Ingersoll-Rand Co., New York, and is shown in the accompanying illustration. It is fitted with a No. 4 Morse taper socket, and will drill up to 3 inches and ream and tap up to 2 inches, running at a speed of 150 revolutions per minute. The motor is of three-cylinder design and operates in an oil bath. Its rotary valve is gear-driven from the pinion of a three-way crank shaft, which is operated by three ratcheted levers directly connecting the pistons to the drill spindle. Owing to this direct connection, it is claimed that there is practically no strain on the crank shaft, power being transmitted direct from the pistons through the levers to the ratchet spindle. The spindle has a triple ratchet, one of the ratchets always being engaged, developing, it is said, more power and a more constant pull. The distance from the end of the casing to the center of the spindle is 1 5/16 inches. The arrangement of the casing permits ready access to all moving parts by loosening several cap screws. It is estimated that this drill can be dismantled and completely reassembled in 30 minutes. The drill is adapted for use in machine and boiler shops, foundries and on bridge construction and structural steel work.

New Hose Coupling

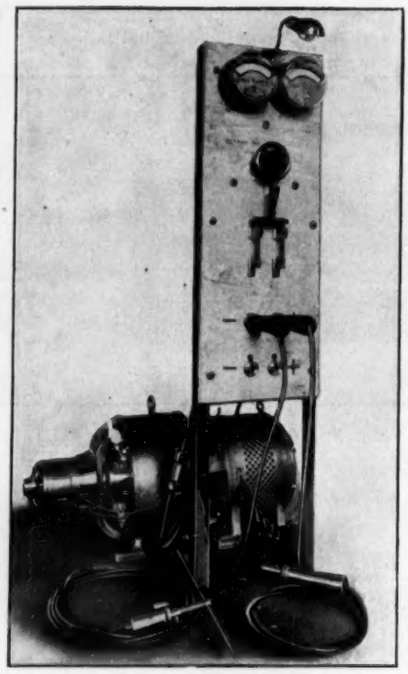
A new coupling is being manufactured by the National Hose Coupling Co., Peoples Gas building, Chicago, for use on hose carrying compressed air, steam or water, and may be attached, it is said, without clamps, straps or special fastening tools. The sockets are malleable, all other parts being manufactured from steel.

The socket is corrugated internally, as shown in the accompanying illustration, providing a positive grip, the expander forcing the hose outward into position as it is screwed into place. The hose enters the socket readily and may be cut and recoupled as often as required. Absence of projections on the exterior prevents catching on sharp corners as the hose is dragged along the floor or over material. No attempt is made to contract the outside of the hose, all stress being applied from the inside. The interior diameter is not lessened.

Electric Welding Outfit of New Design

IN THE accompanying illustration is shown an arc welding outfit with panel board built by the Lincoln Electric Co., Cleveland. It is so constructed that it generates at all times the exact voltage required by the arc and at the same time gives a current which is practically constant. For this reason no resistance is necessary in the circuit to reduce the voltage and, therefore, no power is wasted. This feature is due to special windings in the generator.

The simplest operation for the arc type of tool is the welding of steel castings. If it is desired to fill up a hole in a casting, a depression or other imperfection, the casting is connected to one end of the electric circuit, thus forming one of the electrodes. The operator handling the other electrode brings it in contact with the surface of the casting, then quickly withdraws it a short distance, causing an electric arc to form between the carbon and the casting. After heating the surfaces around the low spot or hole and melting the steel, he places a rod of steel in the flame of the arc and allows the metal to run into the low spot until it is filled. The machine also can be used to advantage for cutting off risers, as well as welding cracks and sand spots. It is claimed also that the electric arc has been used successfully in welding malleable castings. This work usually is done after annealing, although castings can be welded in the hard. This machine also can be employed for welding rolled steel, wrought iron, forgings, and for welding castings to other metals.



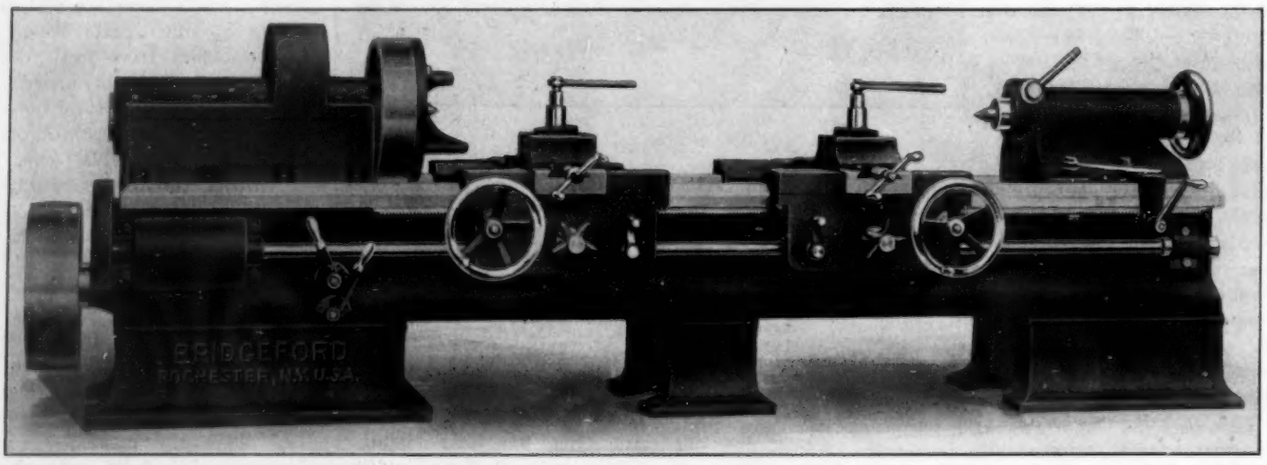
LINCOLN ARC WELDER COMPLETE WITH PANEL BOARD

Direct current is employed and these welders will deliver their rated ampere output continuously with a temperature rise of not to exceed 40 degrees in any part except the commutator, on which the rise, it is claimed, will not exceed 55 degrees Cent. In plants having sufficient work to require more than one operator, a separate unit is installed for each man. Owing to the fact that no power is wasted in resistance, the actual power required to do the welding is small. For ordinary service, with the exception of large steel casting work and heavy cutting, it can be operated on any power line large enough to carry a 10-horsepower motor. This permits the installation of the plant at almost any point in the shop where there is a power line, or it may be made portable and connected where needed. Any number of plants also may be operated individually or in parallel.

Lathe for Plain Turning

A LATHE adapted for plain turning has been developed recently by the Bridgeford Machine Tool Works, Rochester, N. Y. As shown in the accompanying illustration, this machine has fewer parts than a standard engine lathe. It is said to be simple in its operation. Three mechanical speed changes are secured through heavy, cut steel gearing, while the use of a two-speed countershaft increases the speeds available to six. The feed box gives four changes of feed for each change of gear at the end of the lathe. All gears are steel, those for the speed and feed mechanism running in an oil bath. The main driving gear is 6½-inch face, three pitch, with other gearing in corresponding proportions. When motor driven, a 25-horsepower motor is used. The drive is transmitted through a constant speed pulley, the two levers shown at the front of the machine, controlling all changes of speeds and feeds.

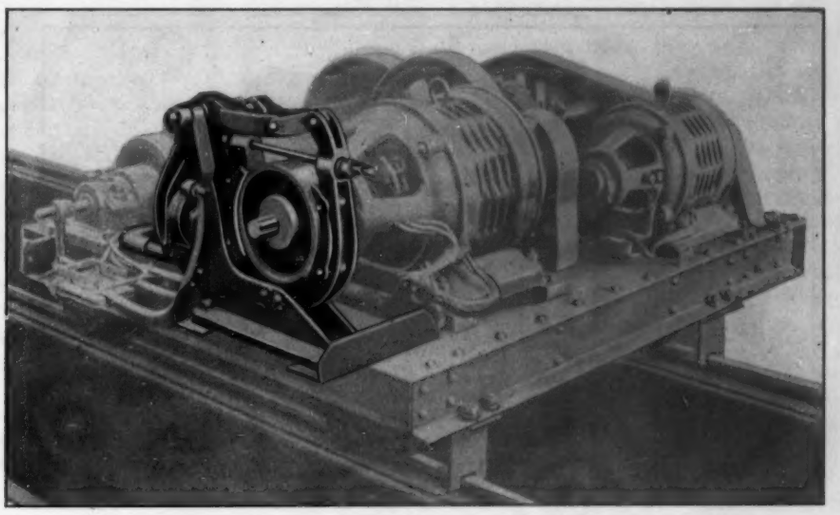
The swing of the lathe over the ways is 27 inches and over the carriages 13½ inches. The maximum distance between the centers is 8 feet.



NEW LATHE FOR PLAIN TURNING

Alternating Current Magnetic Brake

THE new alternating current magnetic brake manufactured by the Westinghouse Electric & Mfg. Co., Pittsburgh, is designed for use with induction motors operating cranes, hoists, roller lift bridges and various mill machinery. The magnet, being wound for single phase, may be used on polyphase circuits. A feature of this brake is its freedom from dependence on gravity, adapting it to use in varied positions. It is claimed that the construction is such that if the operator should fail to take up wear on the brake shoes, the result would not be a failure of the brake shoes to set. On the contrary, they would fail to release the motor until attended. As shown in the accompanying illustration, the brake consists of two shoes forced against a cast iron brake wheel by means of springs. The brake wheel is keyed to the motor shaft. When the motor is started, a magnet coil is energized and the magnet, acting through a lever and toggle, forces the shoes apart and releases the brake. The device is said to be desirable for places where the headroom is limited or where the position of the motor varies, and is also said to be impervious to weather and easy of adjustment.

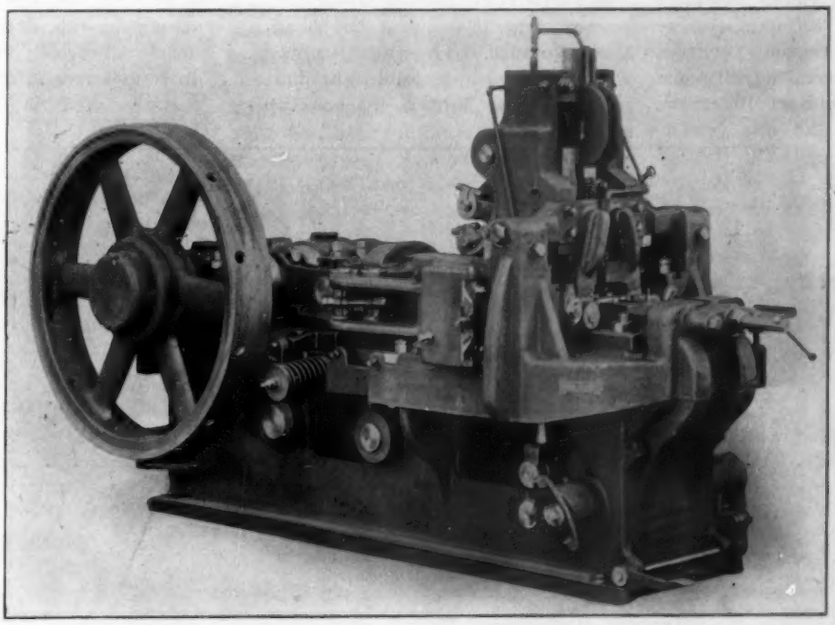


MAGNETIC BRAKE ON CRANE MOTOR

Semi-Automatic Hammer Bolt Header

A NEW continuous motion, semi-automatic hammer bolt header for making square, hexagon and T-head bolts is manufactured by the National Machinery Co., Tiffin, O. The machine is built in ¾-inch, 1-inch and 1½-inch capacities for either belt or motor drive. It is designed to perform the gripping, starting and stopping movements automatically, so that the operator may devote his entire attention to feeding the machine. The main shaft, heading slide, and hammer slide run continuously, as in a rivet header. It is claimed that this does away with the starting and stopping clutch on the main shaft, making higher speeds possible. A feature of this design is the fact that it may be set to make any quality of bolt desired, from three to eight blows, in one cycle, it is said. The length of time that the grips are open for feeding may be regulated according to the length or type of bolt being made, by means of a gear and cam.

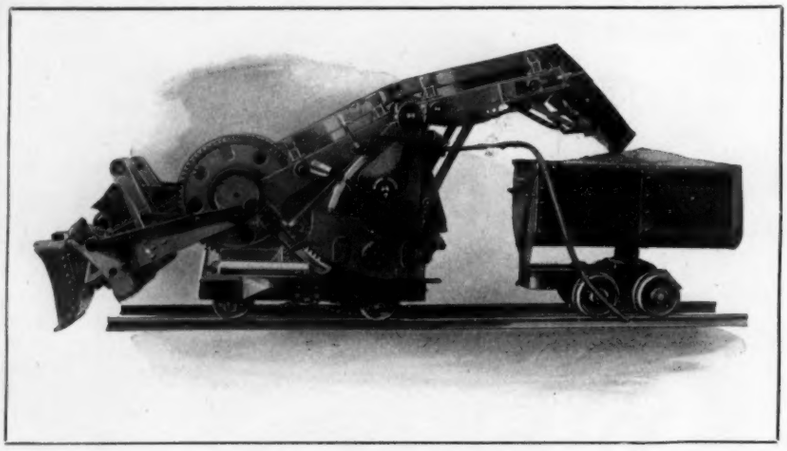
The bed of the machine is of the box type, large and heavily ribbed for rigidity and strength. The header of 1-inch capacity weighs about 13,000 pounds. The fly wheel is of friction-slip construction, serving as an automatic safety device, should cold stock or excess of metal be gripped in the dies, obstructing the travel of the heading tool. The fly wheel also, it is said, protects the motor when the machine is directly motor-driven. An additional safety feature which is said to be of great service is the automatic release which is provided on the gripping mechanism to protect the machine should stock or some foreign object get in the grips preventing the dies from closing. A lever construction carries the lower hammer. Side and top hammer slides have bronze bushed links. The machine is shown in the accompanying illustration.



CONTINUOUS SEMI-AUTOMATIC BOLT HEADER

Halby Automatic Shoveling Machine

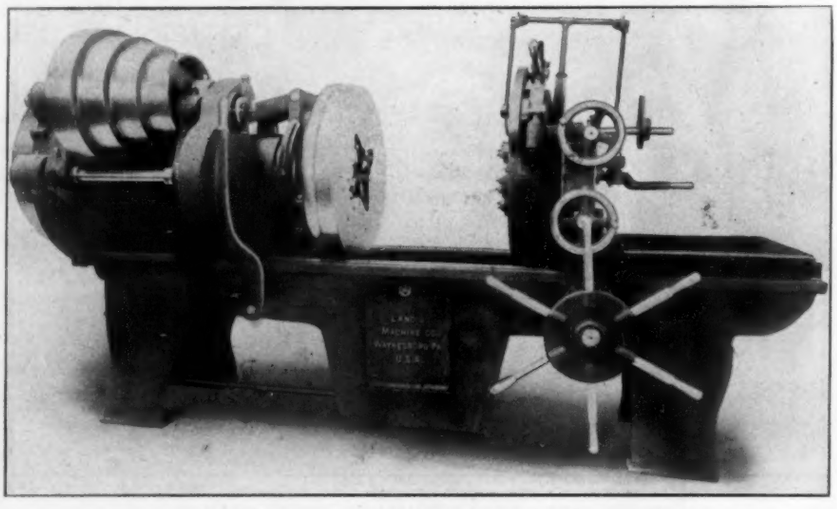
THE desire to lower mining costs coupled, in some cases, with a scarcity of labor, during late years has led to many attempts on the part of iron mine operators to do away with hand mucking. The Halby shoveling machine, manufactured by the Lake Shore Engine Works, Marquette, Mich., is a new device which, it is said, proved successful as a substitute for hand muckers during a six months' trial in a northern Michigan mine. The machine consists of a shovel, which works with much the same motion as that of a man shoveling; a conveyor belt, and a driving and propelling unit. Compactly built in three sections, it is said to be readily demountable, permitting passage through small shafts. The top section, as shown in the accompanying illustration, comprises the shovel and conveyor mechanism; the center section contains the motive power, clutches, and driving gears; and the lower or truck section serves as a foundation. The machine is 15 feet long, 64 inches high, and 48 inches wide, with a total weight of 7,500 pounds. The motion of the shovel, which is made of heavy steel plate with a manganese steel lip and removable manganese steel teeth, is controlled by the operator, who also can move the entire machine backward or forward. The material picked up by the shovel is discharged on the lower end of the conveyor, which carries it over the machine and dumps it in a car at the rear or side. Automatic deflectors guide the material to the center of the car. The weight is distributed so that no matter what the position of the shovel may be, the center of gravity always falls within the radius of the trucks. The machine is furnished with either air, gasoline, or electric power. The truck, in addition to its four driving wheels, is equipped with two front trailers, which, it is said, make it possible to dig around curves. It is claimed that the Halby machine can load 200 tons of ore in an 8 x 8-foot drift under average conditions, in an eight hour shift, at a net cost of $6.37, or at a net cost per ton of 3.18 cents. The manufacturers further claim that this machine may be successfully operated in large copper mines, in ditch digging, and in excavation work for building foundations. It is built in various track gages as required.



HALBY AUTOMATIC SHOVELER

New Pipe Threader and Cutter

A NEW line of pipe threading and cutting machines, whose heads and gripping chucks have universal diametrical adjustments and which require but one set of chasers, it is said, to cover the range of each head, is manufactured by the Landis Machine Co., Waynesboro, Pa. The gripping chucks on the 4-inch and 6-inch machines are lever operated. The die is opened and closed by hand. The machine has eight speeds, and is provided with a universal centering chuck. A rotary pump, automatic bypass for surplus cooling solution, and a special control valve at the head are also provided. The frame is cast in one piece with a fluid-tight bottom. To economize belting, the cone pulley is mounted on top of the machine, as shown in the accompanying illustration. All drive gears are encased, in order to insure safety in operation. The chasers used in this machine are milled from flat bar steel and hardened their entire length. It is claimed that annealing, hobbing, or retempering are not necessary, and that all friction is eliminated, permitting an extremely high speed. The die of the 2-inch head consists of four chasers and that of the 4-inch head of six chasers. The machine's gross weight is 4 tons.



PIPE THREADING AND CUTTING MACHINE

Relation of Production to Costs

An Analysis of the Problem of Expense Distribution Showing the True Relation of Overhead to Cost of Product

BY H. L. GANTT

MANUFACTURERS in general recognize the vital importance of a knowledge of the cost of their product, yet but few of them have a cost system on which they are willing to rely under all conditions. While it is possible to get quite accurately the amount of material and labor used directly in the production of an article, and several systems have been devised which accomplish this result, there does not yet seem to have been devised any system of distributing that portion of the expense known variously as indirect expense, burden or overhead, in such a manner as to make us have any real confidence that it has been done properly.

There are in common use several methods of distributing this expense. One is to distribute the total indirect expense, including interest, taxes, insurance, etc., according to the direct labor. Another is to distribute a portion of this expense according to direct labor, and a portion according to machine hours. Other methods distribute a certain amount of this expense on the material used, etc. Most of these methods contemplate the distribution of *all* of the indirect expense of the manufacturing plant, however much it may be, on the output produced, no matter how small it is.

If the factory is running at its full, or normal, capacity, this item of indirect expense per unit of product is usually small. If the factory is running at only a fraction of its capacity, say one-half, and turning out only one-half of its normal product, there is but little change in the total amount of this indirect expense, all of which must now be distributed over half as much product as previously, each unit of product thereby being obliged to bear approximately twice as much expense as previously.

When times are good, and there is plenty of business, this method of accounting indicates that our costs are low; but when times become bad and business is slack, it indicates high costs, due to the increased proportion of burden each unit has to bear. During good times, when there is a demand for all the product we can make, it is usually sold at a high price and the element of cost is not such an important factor. When business is dull, however, we cannot get such a high price for our product, and the question of how low a price we can afford to sell the product at is of vital importance. Our cost systems, as generally operated at present, show under such conditions that our costs are high and, if business is very bad, they usually show us a cost far greater than the amount we can get for the goods. In other words, our present systems of cost accounting go to pieces when they are most needed. This being the case, many of us have felt for a long time that there was something radically wrong with the present theories on the subject.

How Overhead Adds to Cost

As an illustration, I may cite a case which recently came to my attention. A man found that his cost on a certain article was 30 cents. When he found that he could buy it for 26 cents, he gave orders to stop manufacturing and to buy it, saying he did not understand how his competitor could sell at that price. He seemed to realize that there was a flaw somewhere, but he could not locate it. I then asked him what his expense consisted of. His reply was, labor 10 cents, material 8 cents, and overhead 12 cents. My next question was, Are you running your factory at full capacity? and got the reply that he was running it at less than half its capacity, possibly at one-third. The next question was, What would be the overhead on this article if your factory were running full? The reply was that it would be about 5 cents; hence the cost would be only 23 cents. The possibility that his competitor was running his factory full suggested itself at once as an explanation.

The next question that suggested itself was how the 12 cents overhead, which was charged to this article, would be paid if the article was bought. The obvious answer was that it would have to be distributed over the product still being made, and would thereby increase its cost. In such a case it would probably be found that some other article was costing more than it could be bought for; and, if the same policy were pursued, the second article should be bought, which would cause the remaining product to bear a still higher expense rate.

If this policy were carried to its logical conclusion, the manufacturer would be buying everything before long, and be obliged to give up manufacturing entirely. The illustration which I have cited is not an isolated case, but is representative of the problems before a large class of manufacturers, who believe that all of the expense, however large, must be carried by the output produced, however small.

This theory of expense distribution is quite widespread, and clearly indicates a policy, which in dull times would, if followed logically, put many of our manufacturers out of business. In 1897 the plant of which I was superintendent was put out of business by just this kind of logic. It never started up again. Fortunately for the country, American people as a whole will finally discard theories which conflict with common sense; and, when their cost figures indicate an absurd conclusion, most of them will repudiate the figures. A cost system, however, which fails us when we need it most, is of but little value and it is imperative for us to devise a theory of costs that will not fail us.

Most of the cost systems in use, and the theories on which they are based, have been devised by accountants for the benefit of financiers, whose aim has been to criticize the factory and to make it responsible for all the shortcomings of the business. In this they have succeeded admirably, largely because the methods used are not so devised as to enable the superintendent to present his side of the case. Our theory of cost keeping is that one of its prime functions is to enable the superintendent to know whether, or not, he is doing the work he is responsible for as economically as possible, which function is ignored in the majority of the cost systems now in general use. Many accountants who make an attempt to show it, are so long in getting their figures in shape that they are practically worthless for the purpose intended, the possibility of using such cost data having passed by. In order to get a correct view of

Presented at the Buffalo meeting of the American Society of Mechanical Engineers.

the subject we must look at the matter from a different and broader standpoint. The following illustration seems to put the subject in its true light: Let us suppose that a manufacturer owns three similar plants, of an economical operating size, manufacturing the same article—one located in Albany, one in Buffalo and one in Chicago—and that they are all running at their normal capacity and managed equally well. The amount of indirect expense per unit of product would be substantially the same in each of these factories, as would be the total cost. Now suppose that business suddenly fell off to one-third of its previous amount and that the manufacturer shut down the plants in Albany and Buffalo, and continued to run the one in Chicago exactly as it has been run before. The product from the Chicago plant would have the same cost that it previously had, but the expense of carrying two idle factories might be so great as to take all the profits out of the business; in other words, the profit made from the Chicago plant might be offset entirely by the loss made by the Albany and Buffalo plants. If these plants, instead of being in different cities, were located in the same city, a similar condition might also exist in which the expense of the two idle plants would be such a drain on the business that they would offset the profit made by the manufacturer in the going plant. Instead of considering these three factories to be in different parts of one city, they might be considered as being within the same yard, which would not change the conditions. Finally, we might consider that the walls between these factories were taken down and that the three factories were turned into one plant, the output of which had been reduced to one-third of its normal volume. Arguing as before, it would be proper to charge to this product only one-third of the indirect expense charged when the factory was running full. If the above argument is correct, we may state the following general prin-

(*Continued on page* 288b.)

Engine Lathe for Heavy Reduction Work

AMONG interesting machines included in the railway supply exhibit held at Atlantic City, N. J., in conjunction with the recent railway conventions, was the new type of 42-inch engine lathe, designed by the Putnam Machine Co., Fitchburg, Mass., illustrated on the facing page. This machine is intended for use in extra heavy reduction work and especially for the machining of heavy forgings. The claim is made that it will work up to the limit of high speed cutting steels. It embodies several improved features of lathe design.

The rigidity of construction is reflected in the bed, which is of deep box form with longitudinal central truss and is provided with a cast rack against which the tailstock is braced for severe duty. The side walls are connected at short intervals by broad box ties and the ways are of large section; the front is provided with one raised and one flat way, and the rear with two raised ways. The headstock is of the all-geared, enclosed type and is driven from main pulley by a clutch which is engaged and disengaged from the feed apron. The same movement that disengages the clutch automatically applies the friction brake, stopping the machine almost instantly. A feature of the headstock is that all gears and shafts are placed horizontally, and in the same plane, in the headstock casing proper, and not in the upper half or cover; thus easy access is had to all parts of the headstock. In addition, all bearings are capped, making it easy to remove any shafts in case of necessity.

Eighteen spindle speeds are available; these are obtained through a series of sliding gears and one positive clutch, of the selective type. Of these 18 speeds, six are direct spindle speeds, six are back gear spindle speeds and the remaining six are triple geared spindle speeds. The entire range of spindle speeds is obtainable by manipulating only three levers, and it is impossible at any time to engage gears of conflicting ratios. As an additional safeguard, an elaborate interlocking mechanism has been applied, which necessitates the releasing of the main driving friction clutch and the consequent slowing down of the machine before a speed change can be obtained.

For lubricating the head stock parts an elaborate oiling system is provided, which embraces an oil tank, located on the back of the bed, and a geared pump. The latter sends a steady flow of oil to all bearings and gears in the headstock, thereby relieving the operator of all responsibility in connection with the proper lubrication of the headstock. The lubricating system operates only when the machine is at work, the pump being driven from the initial driving shaft of the headstock.

The tailstock is of massive construction and has a broad bearing surface on the bed. It is kept in alignment with the head by the inverted V-way on the rear and has a wide, flat bearing on the front. The tailstock is of the set-over type and is provided with a spindle of large diameter, which is provided with a bronze nut for the tailstock screw. The tailstock is equipped with a floating binder. To insure correct alignment of the spindle, it is further equipped with a side bracket with gear attachment for facilitating the movement along the bed.

The feed apron is of the double wall type, the use of over-hanging studs being eliminated. The front plate is bolted and doweled, giving easy access to the feed apron gears. Both lateral and cross feeds are effected through large individual friction gears; all feeds are reversed at the apron, a safety device being provided which makes it impossible to engage the screw cutting mechanism while the feeds are engaged. The threads of the lead screw are used only for screw cutting.

The carriage is unusually long and is scraped to uniformity along the entire length of bed. It bears on three straight surfaces on the bed, two on raised ways at the front and rear of the bed and the third on the flat front inside the way. The bearing is not recessed but is in full contact the entire length with the V's. This form of construction not only shortens the bridge of the carriage but provides a solid bearing directly in line with the tool thrust.

The lathe is provided with a chasing dial which makes it possible to chase all threads without reversing the lead screw. The compound rest has a swivel base, is graduated in degrees, and has power, cross and angular feeds. The quick change gear box, which is a unit complete in itself, is bolted and doweled to the front of the bed.

The box provides 32 changes of threads and feeds, in connection with the gearing from the headstock. The taper attachment, which is of substantial type, is manipulated with unusual ease, it being unnecessary to disconnect any parts in order to engage or disengage this attachment. The taper attachment may be used for turning outside and boring inside tapers and is available the entire distance between centers, due to the fact that it is bolted to the carriage and travels with it.

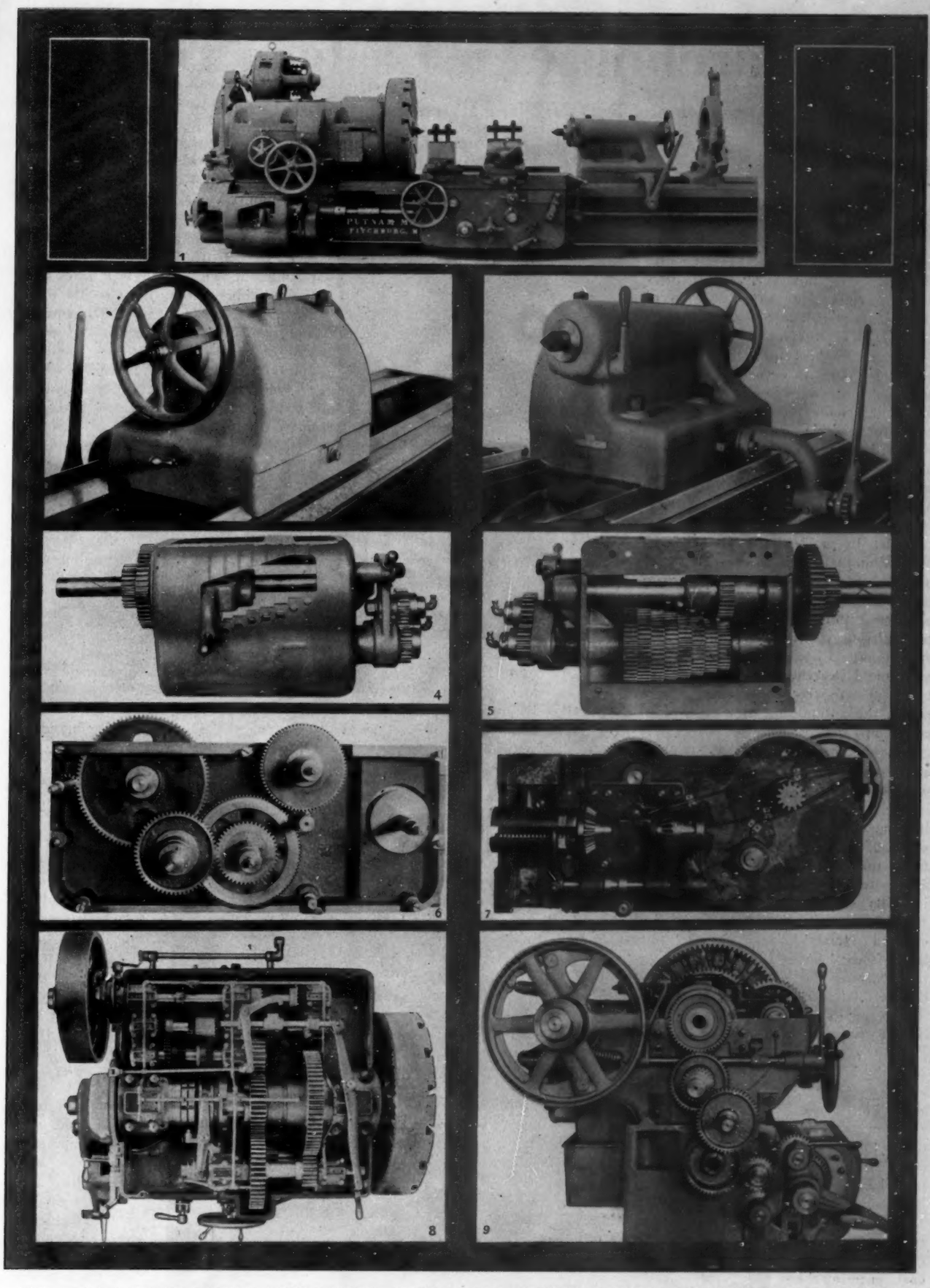


FIG. 1—NEW 42-INCH, GEARED HEAD, ENGINE LATHE; FIG. 2—REAR END OF TAIL STOCK; FIG. 3—FRONT VIEW OF TAIL STOCK, SHOWING GEAR ATTACHMENT AND RATCHET FOR MOVING TAIL STOCK ALONG BED; FIG. 4—FRONT VIEW OF QUICK CHANGE GEAR BOX, SHOWING LEAD SCREW REVERSING MECHANISM; FIG. 5—BACK VIEW OF GEAR BOX SHOWING CONE OF GEARS; FIG. 6—FEED APRON WITH FRONT PLATE REMOVED; FIG. 7—BACK VIEW OF FEED APRON; FIG. 8—TRANSMISSION, PRIMARY AND SECONDARY; FIG. 9—END VIEW OF HEADSTOCK WITH GEAR COVERS REMOVED, SHOWING CONNECTIONS FROM HEADSTOCK SPINDLE TO QUICK CHANGE GEAR

New Warehouse in Eastern District

Description of Ryerson Plant at Jersey City With Details of Equipment—Advantages of Location

THE SALE of finished steel products from warehouses has enjoyed a steady growth for many years. Improvements in the methods of insuring quick delivery to the consumer, however, are of more recent origin but have been very rapidly adopted. The new warehouse of Joseph T. Ryerson & Son at Jersey City, N. J., serves to exemplify modern practice in securing quick dispatch of orders. The Ryerson company has maintained a New York office for many years and the growth of its business in the metropolitan district, led to the decision to erect warehouses conveniently located to handle the trade.

The new warehouse is readily accessible, by a 3-minute tunnel trip, in conjunction with a short automobile or street car ride, from the main offices in New York. To facilitate communication, and especially for transmitting orders and shipping instructions without delay, the main office and warehouse are connected by a private telephone wire. As a result, the assembling of a rush shipment at the warehouse always is commenced within a few minutes after the receipt of the order at the office of the organization in New York.

FIG. 1—FRICTION SAW FOR CUTTING BEAMS AND CHANNELS

The warehouse is on Westside avenue, Jersey City, on a ten-acre site at the junction of the Hackensack river and Newark bay. This location affords facilities for making water shipments to all parts of New York harbor and adjacent waters, and for transshipment to ocean liners. The plant is served by the Central Railroad of New Jersey, two tracks with a capacity of 16 cars entering the building and extending across the south end. The Morris canal, joining Newark bay and the Hudson river, crosses the property. Westside avenue, one of the main arteries of traffic in Jersey City, connects, within a stone's throw of the warehouse, with the Plank road, the principal highway between Jersey City and Newark. The company, in order to give its customers the full advantages afforded by the geographical location of the warehouse, has provided in addition to the former trucking capacity, a fleet of motor trucks for making quick deliveries in Greater New York. Several of these trucks are illustrated in Fig. 4. The building is 350 feet long and 250 feet wide, containing 87,500 square feet. It is of steel construction throughout, with corrugated sides and tile roofing. Four full length bays are provided, two being 100 feet wide and two 75 feet. The roof of each bay contains two skylights running nearly the length of the bay which provide excellent light and ventilation. Facilities also are provided for adequate artificial illumination.

The larger bays are commanded by electric traveling cranes of 15 tons capacity, the smaller by 10-ton cranes. These are employed in receiving and making shipments and in transferring stock. One of the larger bays is used for storing I-beams and channels as shown in Fig. 5, while the other carries angles and reinforcing bars. Of the 75-foot bays, one contains universal and sheared plates, and the other bars, sheets, flanges, rivets, bolts, drills, reamers, bands and strip steel.

Material is handled the length of the bays, from south to north. On reaching the plant, it is distributed to the proper locations by cranes and is taken from these locations as required for filling orders. It is then cut to length as specified, and shipped. Running across all the bays, at the north end of the warehouse, is the industrial track shown in Fig. 3. In conjunction with the cranes, this track is employed for making up local shipments. The track terminates in a loading platform at the east end. Rail shipments, of course, are loaded by cranes into cars on one of the tracks at the south end of the warehouse. One track is employed for receiving and the other for outgoing shipments.

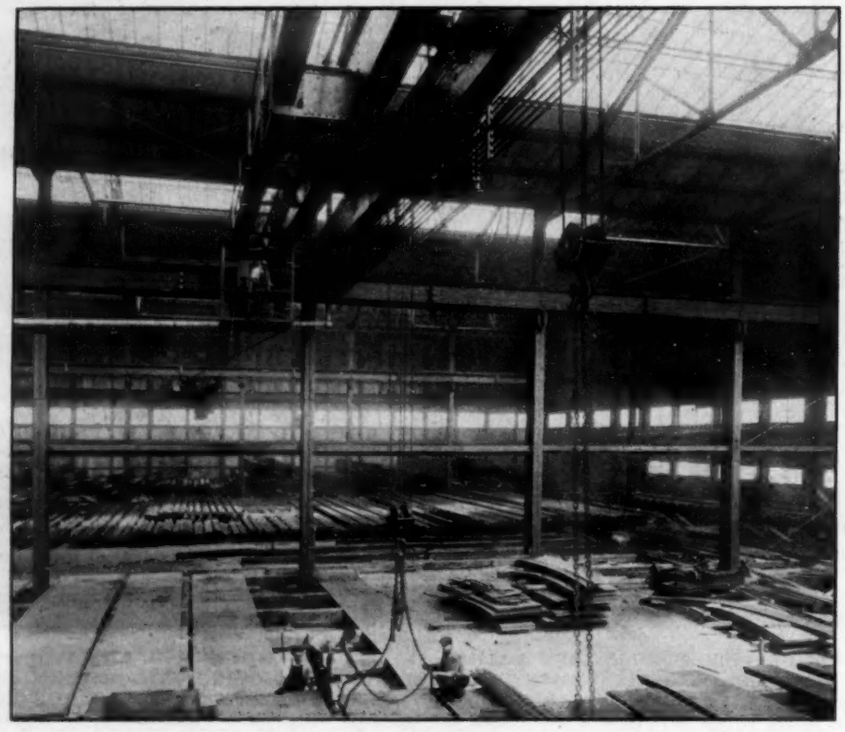


FIG. 2—METHOD OF HANDLING PLATES WITH TWO-TROLLEY HOISTS

The equipment for cutting to length comprises a large Ryerson friction saw which handles all sizes of beams and channels, angle shear, bar shear, 10-foot plate shear capable of handling 1-inch plates, bulldozer for straightening beams, angles, channels, etc., 10-foot sheet shear, machine for cutting boiler tubes, etc. Material is fed to the friction saw over power-driven roll tables. All machines are driven by independent motors, power being obtained from the Public Service Corporation of New Jersey.

In one of the 75-foot bays is a two-story structure, built of steel and hollow tile as shown in Fig. 3. This building is provided with steel racks and bins for storing shafting, tool steel, drills, galvanized sheets, special sheets for stamping and electrical work, etc. This material is handled by the cranes through the use of exposed platforms. The building is equipped with a steam radiation system for protecting the materials against rust. Steam is obtained from a boiler room located in a two-story brick building which abuts the east end of the warehouse. This building contains the shipping office, locker, wash and rest rooms for the employes, a file storage vault, etc.

FIG. 4—TRUCKS FOR LOCAL DELIVERY

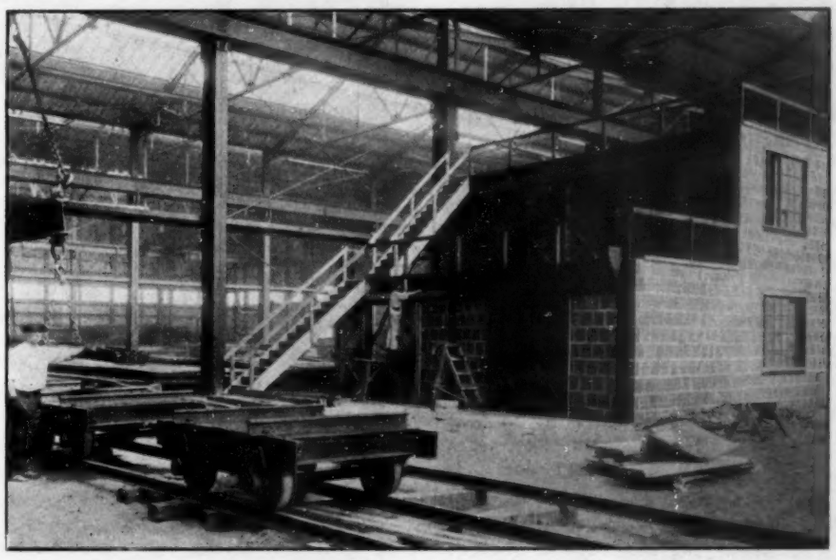


FIG. 3—INDUSTRIAL TRACK AND STEAM-HEATED STORE HOUSE

On the east side of the warehouse is an electrically operated steel derrick which handles materials outside of the building. This derrick commands the truck approach as well as the railroad sidings.

The warehouse has a capacity for storing 25,000 to 30,000 tons of finished steel products. It is designed to serve the consuming trade east of Pittsburgh and Buffalo, and also the foreign trade. The Ryerson company also operates warehouses at Chicago and St. Louis. These were described. respectively, in the January 7 and July 8, 1915, issues of *The Iron Trade Review.*

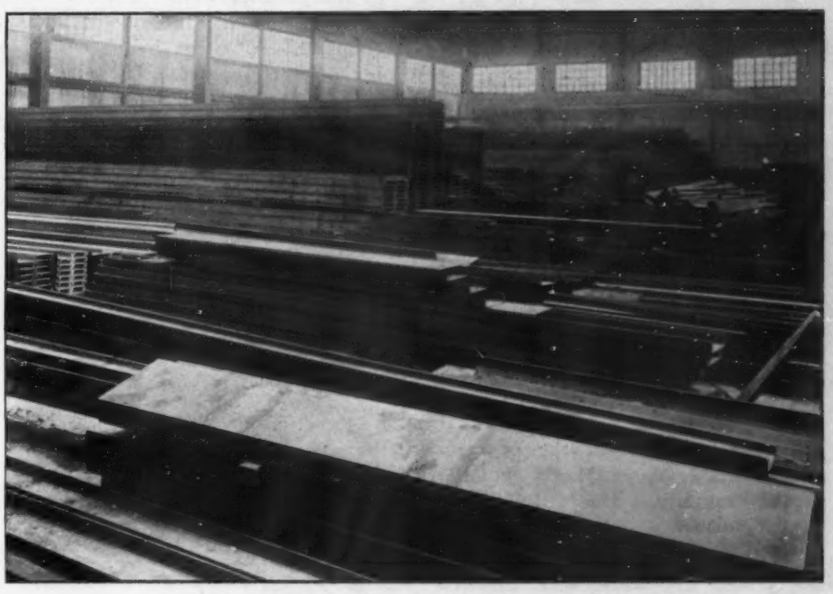


FIG. 5—I-BEAM AND CHANNEL STORAGE

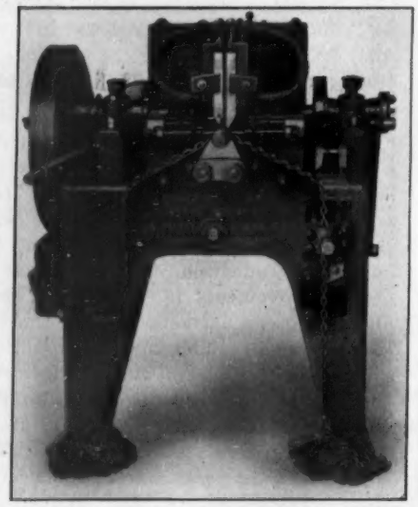
Issues Safety First Manual

The Colonial Supply Co., 412-14 First avenue, Pittsburgh, has issued a comprehensive manual of safety first appliances. The compilation is arranged in permanent and easily accessible form. The manual, after a concise introduction emphasizing recent improvements in safety first appliances, gives extracts from the federal bureau of mines and other authorities, on the use of various devices for preventing accidents and administering first aid. The booklet is profusely illustrated, showing numerous safety first warning signs, which are used around mines and industrial plants, as well as other safety devices.

British Chain Welder

A semi-automatic chain welding machine of recent design, made by the British Insulated & Helsby Cables, Ltd., Prescot, Eng., has attracted considerable attention in the chain-making district of Staffordshire. The machine is shown in the accompanying illustration. The electric arc method of welding is used, the butt ends of the links being brought together by means of a lever. The slight projection left by the arc on the link is automatically ground off before the link leaves the machine.

This welder is made in six sizes. The first welds 15 to 20 links of 13/64-inch steel per minute. The second welds 10 to 18 links of 25/64-inch steel per minute. The third completes from five to eight links of ⅝-inch steel per minute; the fourth size handles 14 to 18 links of calibrated or short link chain per minute, using 13/64-inch

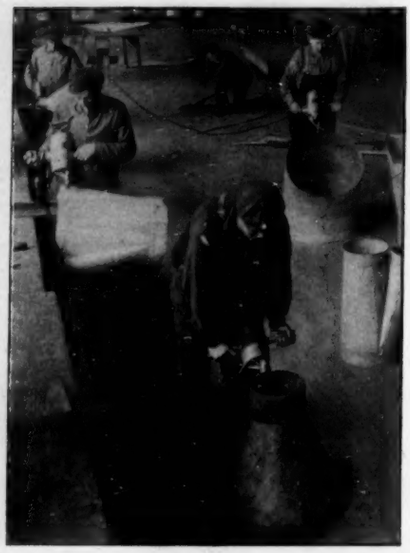


BRITISH CHAIN LINK WELDER

steel, and the fifth produces nine to 16 welds per minute with 25/64-inch stock. The largest machine welds four to seven links per minute, using ⅝-inch stock. A hand operated machine is also manufactured.

Portable Electric Drills

The accompanying illustration shows a group of portable electric drills in operation and demonstrates their adaptability for various classes of work. These drills are made for both small and large work. The small tools, owing to their high speeds and light weight, permit the operator to drill holes in metal or wood with great rapidity. The drills illustrated were furnished by the Standard Electric Tool Co., Cincinnati. These tools can be utilized by means of either direct or alternating current, only



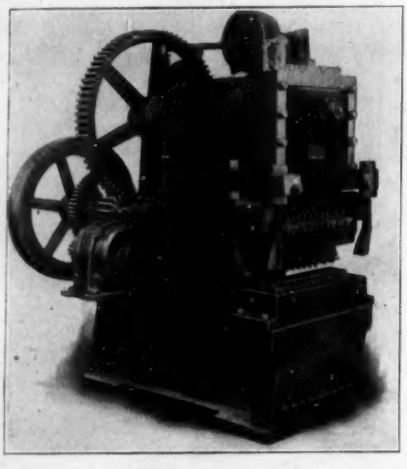
PORTABLE ELECTRIC DRILLS IN OPERATION

a lamp socket connection being necessary for driving the equipment. With large sheets, the drilling is done on the floor, avoiding the necessity of bringing the work to the tool. This feature of bringing the tool to the work is also of value on outside jobs, such as erecting or repairing.

New Multiple Punch

A new multiple punching machine marketed by Bertsch & Co., Cambridge City, Ind., has 20 punching units in its head. These are so designed, it is said, that any number of punches from 1 to 20 may be used, as desired.

This punching machine is provided with special couplings, shown in the accompanying illustration. These were made necessary by the fact that 16 of the punches were too close together to permit the use of the standard coupling. A patent has been applied for on this feature. The machine is

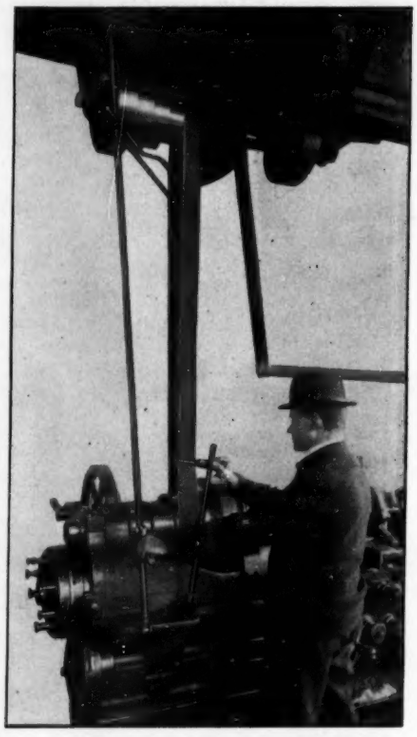


MULTIPLE PUNCHING MACHINE

built with a cored or box-section frame and is designed to withstand heavy strains.

Speed Shifter of New Type

The attachable speed shifter shown in the accompanying illustration is being put on the market by the Dearborn Steel & Iron Co., Chicago, to eliminate the "pole" method of shifting belts and to avoid danger to workmen in handling moving belts. With this device the belt is shifted by two conveniently located handles, without the operator touching it. The accompanying illustration shows how a step-cone lathe is converted into the approximate equivalent of a modern geared head tool. The right hand



WORKMAN OPERATING SPEED SHIFTING DEVICE

handle throws the belt off or on the lower cone and the left hand handle does the same at the upper cone.

Bronze Casting Booklet

A booklet, unusual in its text matter and which contains a large amount of valuable information on mixtures and physical properties of 33 alloys manufactured by the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., is being distributed by the bronze department of this plant, which is engaged in the manufacture of titanium, aluminum and other standard bronze castings. In presenting the approxi-

mate compositions of the various alloys produced, the company states that it is influenced by the feeling that purchasers of high grade bronzes are entitled to know exactly what they are buying, so that they may be in a position to decide whether or not that particular bronze is best adapted to their requirements. Microphotographs of the various bronzes in uniform magnifications of 20 to 200 diameters also are included.

Does Great Safety Work

Among notable results accomplished by the four-year-old safety department of the Inland Steel Co., Indiana Harbor, Ind., may be mentioned the compilation of a safety rule book, of which 29,000 copies were printed in eight languages, a copy being given to each man employed.

Adoption of standard specifications for safety appliances.

Completion of 4,500 safety repairs to prevent accidents.

Distribution of 100 safety watches for prize suggestions relating to safeguards.

Distribution of 2,230 safety service medals to men who passed examination of rules and avoided "lost time" accidents.

Distribution of 7,000 prizes to departments for accident prevention results.

Illustrated lectures on safety for foremen and workmen, and illustrated lectures on public safety for all children of the Indiana Harbor schools.

Reorganization of hospital system and provision for first aid, army stretchers, pulmotors and first aid jars.

Free physical examination of workmen and first aid for sickness.

Active participation in plan of beautifying the works with flower beds, grass plots, etc.

Reduction of 35 per cent in the number of lost time accidents.

Three hundred and twenty-nine men saved from serious injury and eight from death.

Promotion of the Inland Fellowship Club and adoption of a visiting nurse service for benefit of employes.

Sparks from the Grinding Wheel

By H. O. Tair

THE FIRST naval victory of the American revolution was gained with pitchforks forged in a Maine smithy. The decisive naval battle of the war of 1812 was won with cannon served by some of the same men who had helped to mine and smelt the ore and to cast and bore the weapons. In these days of warfare as a contest of ingenuity, is there any reason to believe that in emergency, American brains would not prove equal to the need once more?

* * *

Manufacturers inclined to worry over competitors' knocks would do well to think of the iron column of Delhi, whose skin was so toughened by hammering as to make it last more than 3,000 years.

* * *

Since the *Eastland* disaster, the oxy-acetylene torch has been admitted to a place of honor beside the pulmotor as a life-saver.

* * *

The manufacturer who takes lay visitors down in the foundry's main bay when a ladleful of hot metal is rumbling and swinging overhead or who leads 'em out on the bridge in the rolling mill just as a rail comes snaking along to halt underfoot, should not feel hurt at the visitors' apparent lack of interest in his explanations of technical details. There's a reason!

* * *

They know the horrors of war—those Pennsylvanians who petitioned their town council to abate the noise of a factory which worked nights on munitions for the allies!

* * *

A firm bidding on a St. Louis municipal bridge the other day claimed it could save the city money by lending special erection machinery. The president of the board of public service declared after investigation that such modification of bids was against the law. Anyway, he added naively, "The firm's bid would still be higher than somebody else's"!

* * *

Purgatory defined—a spiritual Bessemer converter.

* * *

First sailor.—How do you pronounce La Follette?

Second sailor.—Accent on the "Foll" —the T's silent as in "fish".

* * *

Cotton ties, says market reports, may be bought at 85 cents a bundle of 45 pounds. This leaves no excuse for neglect of one's haberdashery.

* * *

In this country there's a big demand for antimony to use in coffin-trimming metal. Over in Europe they put it in metals used to fill coffins with.

* * *

By the time Henry Ford is through, horses will be either in the big game or extinct fauna class.

* * *

Which are the worst, dum-dum bullets or rum-dum generals?

* * *

Specifications for England's 1916 war machine may or may not include a spring drive.

* * *

Speaking of shrapnel orders and righteous indignation, where have we heard that name Mauser before?

* * *

Bryan has resigned; the rest of the country is.

* * *

Anybody know what's become of the knockabout comedians, Grape and Canister? Col. Shrapnel seems to be hogging topline honors these days.

* * *

"Heavy Shipment of Bars" reads like an export notice from a new dry state.

* * *

Shrapnel manufacture demands revision of the old proverb into "every billet has its bullets."

* * *

"Labor Troubles Reduce Output." Yes, that's usually their main result.

* * *

"Some quicksilver," says a market item, "may be expected from Mexico and other neutral countries." Great Scott! Poland or Luxemburg, perhaps?

* * *

On November 4 we shall revamp the old Gilbert and Sullivan song, "When Britain Really Ruled the Waves," into "When Columbia Really Sailed the Waves."

* * *

Reports claim the pipe market is active. The war news indicates this is also true of the pipe-dream market.

* * *

Some people think the prosperity we now enjoy as a result of others' misfortunes is only temporary. But then, there's always some old fashioned croaker around to take the joy out of life.

* * *

American Can Co. going to make shrapnel? Why not canister?

* * *

It used to be "Our Yankee Cousins." Now it's "Our Anglo-Saxon Brothers."

* * *

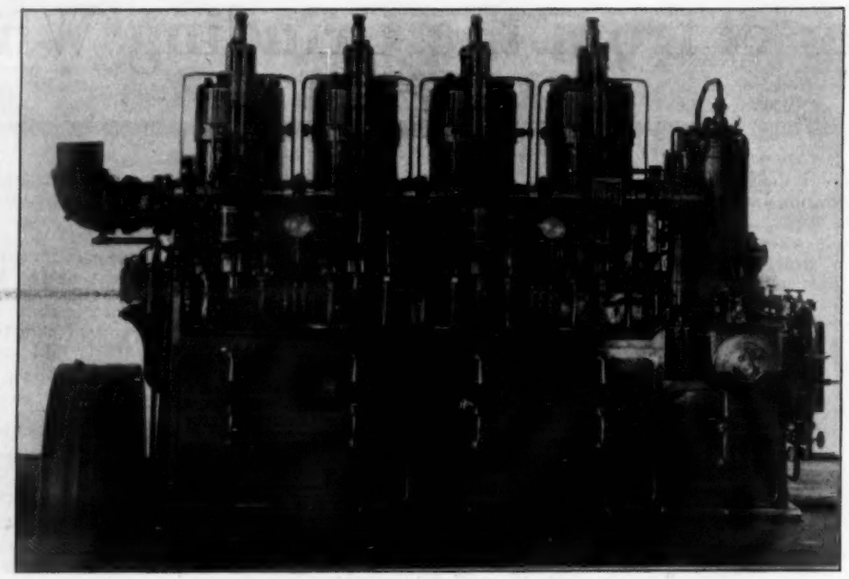
A brass rail factory has been opened in Boston. This would seem an inauspicious time for launching a brass rail business, with prohibition making such strides as it seems to be, these days.

Make Test of New Type Prime Mover

Builders of Southwark-Harris Crude Oil Engine Conduct Interesting Test—Details of Design and Operation

THE first application of the new Southwark-Harris engine was made recently in a trial trip of the yacht SOUTHWARK in the Delaware river. The performance of this prime mover, which operates on the diesel principle, is said to have been highly satisfactory. The engine is being manufactured by the Southwark Foundry & Machine Co., Philadelphia, which has been granted the United States license by the Harris Patents Co. The engine was invented by Leonard B. Harris.

The engine used in the trial trip is shown in the accompanying illustration. It has four cylinders, the indicated horsepower being 240 and the brake horsepower 150. The weight of the engine, inincluding flywheel, is 24,000 pounds. SOUTHWARK is 98 feet in length, with 16-foot beam and 7-foot draught and during the cruise easily maintained a speed of 12 miles per hour. It proved directly reversible from full speed ahead to full speed astern within five seconds, the engine in all cases starting and reversing under full load. The engine developed full power within 10 seconds of starting. It operated on fuel oil costing 2½ cents per gallon, the consumption being at the rate of 7½ gallons per hour.



SOUTHWARK-HARRIS DIESEL TYPE ENGINE

The Southwark-Harris engine contains a number of features which are new in diesel engine design. Of chief interest is the scavenging pump, which in addition to scavenging performs other functions. This pump is of the step-piston type, that is, the piston on the scavenging pump is an enlarged extension of the main piston, working in its own cylinder below the working cylinder.

The normal function of the step-piston is to draw in a charge of fresh air on each downward stroke and, on the upward stroke, deliver it to the adjacent working cylinder through a manifold. The cylinders, of course, are arranged in pairs, the step-piston of each scavenging the working cylinder of the other. In addition, the step-piston is employed for starting or reversing the engine on air. On moving the starting lever, either ahead or astern, each scavenging cylinder immediately is converted into an air motor; the suction and delivery valves are cut out automatically, the air starting valves automatically open and compressed air enters the cylinder and operates the step-piston. On continuing the movement of the handling lever, the atomizers supply fuel to the working cylinders, and thus the engine begins operating on fuel. At this instant in the cycle of operations, therefore, the engine is being operated both by oil and by compressed air. It is customary, after starting, to operate the engine on fuel oil only, although, if desired, the power may be augmented by consuming both compressed air and oil at the same time.

In ordinary diesel type engines, air at high pressure is admitted into the hot working cylinders for starting or reversing, this air being stored in bottles or tanks at a pressure of 800 to 1,000 pounds per square inch for two-cycle engines, or 300 to 800 pounds per square inch for four-cycle engines. In the Southwark-Harris engine, the necessity for admitting high pressure air into the working cylinders, with a corresponding lowering in temperature, is effectually eliminated by the use of the step-pistons. Incidentally, each scavenging piston has a greater area than each of the main pistons, thus permitting the engine to be started under load, with air at 175 pounds pressure instead of at the usual pressure of 800 to 1,000 pounds.

Another feature made possible by the use of the step-pistons is that while starting on air, the atomizer valves do not operate until the operator engages them and, consequently, the engine is provided with none of the usual by-pass valves. Each cylinder is provided with only one cam, which is employed for operating the atomizer. Scavenging air is admitted to the working cylinder through ports in its circumference and the exhaust gases pass through ports located opposite the scavenging ports; these ports are so placed that the piston opens and shuts them at the correct time during its stroke.

Each step-piston, being subject to very little expansion and contraction, may fit rather snugly in its cylinder and thus acts as a guide and crosshead for the working piston, taking the side thrust of the connecting rod and keeping the wrist pin away from the hot working piston. An additional advantage afforded by this engine is that the air drawn in by the scavenging pumps helps to cool the working pistons, the air itself thus being heated slightly at the same time. As a result, this scavenging air never enters the working cylinders cold.

The reversing of the engine is accomplished by moving one rod on each cylinder, which can be done by hand without the use of compressed

air, the same wheel or lever which admits the starting air and the fuel oil, controlling these rods.

The governor is of the centrifugal type, acting directly on the fuel pumps by varying the strokes of all the pumps at once. The speed of the engine may be varied instantaneously, the governor all the time maintaining complete control. The governor may be set to any speed before starting the engine, and, when started, the engine will come to this pre-determined speed and remain there.

The engine, it is said, may be operated on any grade of fuel or crude oil having a gravity of 18 Baume or more. It is adapted for supplying power for railroad motive work, in stationary power plants and can be applied to general power and lighting purposes.

Inspect Canadian Plants

To Determine Capacity for Making Shells—Method of Distributing Orders Causes Complaint

Toronto, Aug. 2.—The Canadian shell-making industry remains in an unsettled condition, owing to the uncertainty of further orders. David A. Thomas, representing the British minister of munitions, has arrived in Canada accompanied by Gen. R. W. Mahon and R. H. Carr, and states that the object of the deputation is not to give orders for munitions, but to investigate the capacity of Canadian factories for turning out shells, rifles and high explosives. Any orders to be given out will come through the shell committee at Ottawa. Mr. Thomas and party are now making an inspection of the plants in eastern Canada. In the meantime, owing to the impossibility of converting unloaded shells into fixed ammunition as fast as they are produced, a halt has been called in the manufacture of shell cases, and when present orders have been filled a number of men employed in Toronto shops are likely to be laid off. There is considerable dissatisfaction on account of the way the business has been managed, as the smaller manufacturers who have equipped themselves with the requisite machinery now find themselves approaching a standstill.

The example of the Ontario government in voting $500,000 for the purchase of machine guns for the Canadian troops has been followed by many municipalities, corporations, societies and private individuals. The subscriptions already received and promised are sufficient to purchase 1,500 machine guns, which will be sufficient to equip all the Canadian forces in the field. These guns cannot be made in Canada and large orders will consequently be placed in the United States.

Col. Thomas Cantley, president of the Nova Scotia Steel & Coal Co., states that the company's plants at Sydney and New Glasgow are running at full capacity. The pay roll is the largest in the history of the company, $59,000 having been disbursed in wages for two weeks. The shipping of the 2,000 cars, which the company is manufacturing for the Russian government, will begin this month and when this order is filled the manufacture of 1,000 cars for France will be commenced. Negotiations for more war orders are under way.

President J. H. Plummer, of the Dominion Steel Corporation, states that the plant is now working almost to capacity, there being more activity than at any time during the past three years. Many obstacles which the company had had to contend with were being overcome, among them the difficulty of obtaining vessels for the export trade which was being arranged satisfactorily. The company was sharing in the war business only in the line of making shell steel, and would have plenty to do along other lines. Prospects for the immediate future of the steel business were much better than they appeared a month ago.

Morley Davidson, vice president of the Grand Trunk Pacific railway, announces that the installation of oil-burning locomotives on the mountain section of the line has now been completed. They are operating from Jasper to Prince Rupert, over 719 miles of the main line. Great oil-storage tanks have been erected at various points along the line for supplying fuel to the locomotives.

Death of Alex. Milne

Alexander Milne, who died Aug. 1 at his residence in White Plains, N. Y., in his eighty-third year, was senior member of the firm of A. Milne & Co., New York, Boston and Chicago, steel and iron merchants.

Mr. Milne was born in Montrose, Scotland, but went to Sheffield, Eng., when about 19 years of age and entered the employ of Henry Roessel & Co., steel manufacturers and merchants, and later with Vickers Sons & Co., Ltd., who in 1869 sent him to this country to promote the sale of their steel in America.

Two years later he was associated with the firm of Naylor & Co. He became a member of the firm in 1883, and while associated with it took an active part in the management of the Norway Steel & Iron So., South Boston, Mass., where his practical knowledge of the manufacture of steel acquired in Sheffield proved of great value in the development of the business of that company. He withdrew from the firm of Naylor & Co. in 1887 and established the firm of A. Milne & Co., iron and steel merchants, and representing Alrutz & Co. and their successors, C. & J. Svedberg, of London and Stockholm.

M. Milne was well and favorably known among the iron and steel manufacturers of this country. He remained in active business up to the time of his death.

Mr. Milne was widely known as one of the oldest golfers in this country, having won the championship of his school in Montrose, Scotland, in 1846. He competed annually in the seniors' tournament at Apawamis.

Stricken at Banquet

William Carric Moore, vice president of the Wrought Iron Range Co., St. Louis, died in St. Luke hospital in that city, July 28. Mr. Moore had made his home in Knoxville, Tenn., for the last six years, and had gone to St. Louis to attend a banquet in honor of his seventy-second birthday. He was stricken with apoplexy while at the banquet at the Hamilton Hotel and removed to the hospital, where he died three hours later. He had charge of all of the superintendents of the company, and intended to preside at a conference of these men while in St. Louis. Mr. Moore is survived by his widow and a married daughter.

National Spring & Wire Co., Albion, Mich., is completing a building 60 x 192 feet, two stories, constructed on the trussed concrete system of reinforced concrete. It now is starting another building 60 x 92 feet, of the same construction as the first building. These buildings are to be completed by Oct. 1. The company advises it has not determined whether it will need any more machinery than it has purchased.

News of Employers and Employes

Bethlehem Steel Co. and Other Manufacturers Announce Wage Advances—New Working Hours at Some Plants

A NUMBER of advances in wages were announced last week, the most important being that of the Bethlehem Steel Co., by President E. G. Grace, who stated that a general increase for all employes would be effective Aug. 1. It is understood that the increase will amount to about 10 per cent. President Grace's announcement, in part, follows:

"This action is done in recognition of the loyal and faithful service the company has received from its employes, and is made possible at this time by the general improvement in business conditions resulting in the operation of both the Saucon and Lehigh plants on practically a 100 per cent working basis."

The Wolverine and Mohawk copper mining companies, in paying their 1,200 employes last Saturday, included an extra check of 5 per cent of the total wages in June as a bonus on account of the high price at which copper is selling.

At Bridgeport, Conn., notice was given to 3,000 workmen of the Locomobile Co. of America that profits will be shared with the workmen. The plan is to increase wages proportionately with the increase of product.

The Winchester Repeating Arms Co. announces a new time schedule at its New Haven, Conn., plant, based primarily upon a reduction of the normal schedule from 55 to 48 hours a week, to become operative Aug. 15, and affecting 10,000 employes. Employes on piece work will receive increases in wages which will equate them for loss which might come with reduction of hours, and a 50 per cent bonus is to be given for overtime to all except piece workers. There are to be bonuses for night workers, except those on piece work, in most instances these to be figured at 10 per cent on weekly wages.

The company says its action is purely voluntary, no demands for shorter hours having been made by the employes. The plant has been working night and day for months on war orders for munitions in addition to regular business. The company recently announced the establishment of a pension system for employes.

Employes of the Colt Patent Firearms Mfg. Co., Hartford, Conn., were informed Saturday that a bonus of 12½ per cent will be paid to all employes, based upon wages earned and dating from May 1 last.

The Sauer Motor Co., Plainfield, N. J., has increased the wages of 800 tool makers, machinists and machine operators from 10 to 12 per cent. This increase was effective Aug. 1.

The Blair Tool & Machine Works, Inc., New York City, and the Cameron Machine Co., Brooklyn, have lowered the working schedule from nine to eight hours a day.

The smelters of the Salt Lake valley, the Utah Copper Co., and others, have announced a voluntary increase in wages which amounts to $750,000 per annum. Between 7,000 and 8,000 men are affected. The raise was effective Aug. 1. General Manager R. C. Gemmel, of the Utah Copper Co., says:

"The raise is based on the price of copper, being above 17 cents a pound. We consider it but just that the men should get their share of the profits from the increased price of copper. The men have shown no discontent and have not asked for a raise lately. This will come as a pleasant surprise. I hope that we will be able to make the advance permanent."

In some cases workmen seem to have been inspired by the reports of highly profitable war orders to the making of unreasonable demands upon their employers. Some 600 employes of the Becker Milling Machine Co., Boston, struck recently because of the refusal of the company to grant their request for increased wages of approximately 20 per cent, and the reinstatement of discharged workmen. About 180 employes of the Crucible Steel Co. of America plant, at Harrison, N. J., walked out last Thursday, although they had received an increase on Tuesday to 19½ cents an hour. They now want 22 cents and a shorter day. The strike has not affected work seriously.

Ford on Hours

Henry Ford, Detroit, automobile builder and social student, is quoted by John R. Lee, head of the sociological department of the Ford works, to the effect that he is opposed to a shorter work day than eight hours. Mr. Ford, it is said, expressed the opinion that a shorter work day would give too much time for loafing. This statement was made in refutation of a report that the automobile concern plans to substitute a six-hour work day at $6 a day for the present day of eight hours at $5.

Welfare Building

The late Thomas D. West used to say that foundrymen, in order to obtain a high grade of workmen, would be compelled to so equip their foundries that the men, after a hard day's work, could take a bath, put on clean clothes and go home looking like gentlemen, without soiling the clothes of the ladies who happen to sit next to them in street cars. In harmony with this idea, the Reading Steel Casting Co., Reading, Pa., has erected a welfare building for the use of its employes. The building will serve as the home of the Reading Steel Casting relief association, which was formed in 1910 by the employes of the company. In the basement of the building are 290 lockers, five shower baths, 28 stationary wash stands and toilets. Nearly all the employes come into the room in the morning, change their clothes and go to work. When their work is done, they take a shower bath and redress.

On the first floor is an emergency hospital, equipped with medicines and modern appliances. On the same floor are an office for officers of the association and a store at which cigars, tobacco, candy, workingmen's gloves and other articles are sold. Other features are a reading and writing room, a pool and billiard room and kitchen. On the second floor is a large assembly room which can also be used for dancing.

The generous patronage of the home indicates that it is thoroughly appreciated by the employes. The spirit of the Reading Steel Casting Co. is shown not only in the building of the home, but also in the surroundings. The well kept lawns are studded with flowers and everything possible is done to contribute to the comfort of the men.

Would Keep Good Men

The New England Westinghouse Co., a $2,000,000 Massachusetts corporation, which, in June took over the plants of the J. Stevens Arms & Tool Co., Chicopee Falls, Mass., and the Stevens-Duryea Automobile Co.,

in Chicopee Falls and East Springfield, Mass., for the manufacture of war munitions, announces the inauguration of a system of bonuses to all employes, who are expected to number about 8,000. It is based on wage earnings and is retroactive to May 1, with payments every three months, the first coming on Aug. 6, for the three months ending Aug. 1. It is estimated that the bonus system will mean a cost of from $500,000 to $600,000 to the company a year.

The payments are based on a rising percentage scale, 3 per cent of the total earnings being paid at the end of three months, 6 per cent at the end of six months, after deducting previous payments, 9 per cent at the end of nine months, after deducting the two previous payments, and 12 per cent at the end of the year, after deducting the three previous payments. At the end of two years' continuous employment, a further bonus will be paid on a basis equal to 15 per cent of the earnings for the year. The average for the two years is an increase in earnings of about 13½ per cent.

Vice President Louis A. Osborne of the company says the object of introducing this system is to get a good class of workingmen who are willing to stay with the company. It is a way of compensating such men for faithful service, for by it they get advances automatically by virtue of their staying with the job. Mr. Osborne says to have a skilled employe means something to a company, and it would be a far more costly operation to discharge him on the eve of payment and secure another man, with the risks of his not being as valuable as his predecessor, than to keep him and pay what is his due.

Flirting With Machinists' Union

Frank Jennings, a vice president and general organizer of the International Association of Machinists, while in Springfield, Mass., last week, announced that the Russian government is willing to back the association with an unlimited amount of capital if the members should decide to enter the business of making war munitions. "There are so many orders going begging," declared Mr. Jennings, "that the association, with its membership of more than 80,000 men, is in line for the business.

"Negotiations have been under way for some time with the Russian government looking toward the financing of the project should it be undertaken. We have been given to understand that the Russians are willing to put up the money should we decide to take up the proposition. If we do go into the business, we can guarantee a wage scale of $8 a day to skilled workers, such a day to consist of but eight hours. On that basis, we could turn out the work and still make mighty good money."

Since the big demand for machinists in New England is on the increase because of the war, the international association has taken steps to increase its membership in that territory and now has several organizers at work. Mr. Jennings has left the Worcester district for other parts and his place there has been taken by J. H. Gilmour, who is holding daily meetings at shop gates in an effort to get the men interested in the union. Worcester has never been a strong union city for machinists and while there has been a union for some time, it has never been active and never met regularly. The organizer now claims a membership of 400, which is considered large, and meetings are held weekly. Most of the machinists of the city are skilled mechanics and it is this class that decline to become union men on the ground that they can get as much money a week without its aid, no matter where they go, thereby saving the cost of initiation and other expenses that go with an organization.

Can Carry Employer's Liability

Frank Taggart, superintendent of insurance of Ohio, has rendered a very important decision in regard to employer's liability insurance in Ohio. On March 17, 1913, the Ohio legislature passed a workmen's compensation law, and on April 1, 1914, licenses issued to insurance companies contained the phrase "accept employer's liability insurance", thus preventing the companies from carrying liability insurance. An identical form of license was issued on April 1, 1915, and the insurance companies then set up the claim that they were entitled to have a license issued in the language of the general code. Supt. Taggart decides that the companies are right in their contention and can issue liability insurance under the law of Ohio. It is understood that this decision will be contested in the courts.

The C. H. Cowdrey Machine Co., Fitchburg, Mass., is making extensions to its plant, found necessary to fill a big order for constructing bread wrapping machines, for a Nashua firm. The company is not handling large contracts for war munitions except for the United States government.

Ore Rates

May be Reduced—Railroads Submit Answers to Questions

Washington, Aug. 3.—Complying with the request of the interstate commerce commission, railroads have just submitted to that body replies to nine questions sent out several months ago with regard to freight rates on iron ore from Lake Erie ports to consuming districts in western Pennsylvania, Ohio and West Virginia. These questions and answers pertain to rates on ore, the volume carried, the rate division between carriers, profits netted, mileage and traffic movements in general.

The commission desires this information in connection with its investigation by which it is proposed to readjust the ore rate structure, as it applies to the affected territories. The investigation was taken up following complaints filed with the commission by furnace interests in the Mahoning and Shenango valleys and in the Pittsburgh and the Wheeling, W. Va., districts. Protest was made by consumers in the valleys against the rate of 56 cents a ton and by the Pittsburgh and Wheeling shippers against the rate of 88 cents a ton. Complications having risen in settling these two cases, the commission concluded to enlarge its investigation so as to embrace the wider territory, whose rates are now under investigation.

It is believed the commission will be able to begin hearings early this fall and that shippers will not submit much additional evidence to the already voluminous records that they have filed with the commission. While the replies made by railroads have not been made public, it is the opinion in some quarters that they are favorable toward reductions of ore rates, particularly to the valleys and the Pittsburgh and Wheeling districts. It is asserted that the answers denote a reduction to 70 cents per ton to the Pittsburgh and Wheeling districts and to 50 cents to the valleys will be found justified. Valley interests, however, have urged that the rate to their furnaces should be leveled to 40 cents a ton.

The Republic Iron & Steel Co., Youngstown, O., has determined to establish its Buffalo and its Detroit branch sales offices as district sales offices, this to become effective Aug. 1. These offices heretofore have been conducted under the direction of the Cleveland sales office. M. E. Gregg will continue to be district sales manager at Buffalo, and C. S. Powers at Detroit.

Money and Iron: Fact and Comment

Hysteria About War Orders Causes Sensational Advances—

Inland Steel Co. Makes Good Showing

EXCITEMENT about war orders was at high pitch on the New York stock exchange last week. Nearly every industrial stock made a net gain during the week and some of the ups and downs were sensational, the star actor being Bethlehem, which closed Saturday at 255, a gain of 54, while Bethlehem preferred made a gain of 5. Advances started early in the week and the very favorable report of earnings of the United States Steel Corporation helped the upward movement. Tuesday, Bethlehem Steel made an advance of 29 points. Wednesday stock sales amounted to 1,234,800. There was a grand rush for war stocks. Sales of Crucible Steel amounted to 162,200, while those of United States Steel amounted to 157,400, and Westinghouse Electric, 158,000. After the close of the market, Chairman Tripp, of the Westinghouse board, announced that the company had closed for another order for 800,000 rifles, with an option on 200,000 more. Thursday stock sales amounted to 1,418,000 shares, the leader again being Crucible Steel, with 172,600 shares sold, while United States Steel followed with 163,500 and Westinghouse with 94,600. Sales of 101,300 shares were made of Republic Steel, which advanced 2 points on both common and preferred. Friday there was more sanity on the market and some declines were noted. Similar conditions prevailed Saturday, when an exciting week came to a rather tame close.

Quotations at the close of business July 31, and changes in the leading stocks identified with the iron and steel industry for the week, are shown in the following table:

	Close July 31.	Net chg.
Amer. Brake Shoe & Fdy. Co., ctfs.	100¼	—2¼
Amer. Brake Shoe & Fdy. Co., ctfs., prfd.	160	.....
American Can	57½	+ ⅝
American Can, prfd.	106	+ ¾
Amer. Car & Fdy. Co.	56⅜	— ⅛
Amer. Car & Fdy. Co., prfd.	.....	.....
American Locomotive	53¾	+1¾
American Locomotive, prfd.	96	+ ⅛
American Steel Foundries	43	+3
Baldwin Locomotive	78⅛	+1⅜
Baldwin Locomotive, prfd.	104½	+1¾
Bethlehem Steel	255	+54
Bethlehem Steel, prfd.	130	+5
Colorado Fuel & Iron	39	+4⅜
Continental Can	74¼	+5¼
Continental Can, prfd.	101	+1
Crucible Steel	68	+23
Crucible Steel, prfd.	103	+6
General Electric	171½	+ ¼
International Harv. of N. J.	98	+1
Inter. Harv. Corp.	60	.....
Nat'l Enamel'g & Stamp. Co.	24½	+4⅛
Natl. En. & Stp. Co., prfd.	88½	—1
Pressed Steel Car	50⅝	+ ⅝
Pressed Steel Car, prfd.	100	+ ⅛
Pullman Palace Car	161	—1
Republic Iron & Steel Co.	42⅝	+6¾
Republic Iron & Steel Co., pr.	95¾	+2¾
U. S. Cast Iron Pipe & Fdy.	16	+1
U. S. C. I. Pipe & Fdy., prfd.	36	+ ⅜
United States Steel	65⅝	+2½
United States Steel, prfd.	113	+1⅞
Westinghouse Mfg.	110½	+3¼

Fear and Frenzy

Two distinct periods have characterized the stock market during the past year, one of fear, and the other of frenzy. The first period began with the inauguration of the war and continued until almost the end of the year 1914. During the months when the stock exchange was closed, there was constant anxiety as to what would happen when it opened. The opening came gradually in December and minimum prices were maintained, but there was no shock and little excitement. As foreign countries began to purchase extensively in the United States and gold poured from other shores to this country, a period of frenzy was inaugurated and last week was at its height.

Glancing back over the year, Bethlehem Steel appears most prominent in advances. On July 30, 1914, the common stock was quoted at 30, and last Saturday it closed at 255, while preferred advanced from 81 to 131½. There are other spectacular advances in war stocks, but in those stocks not so classified, reasonable advances were made, as, for example, Steel common, from 51⅞ a year ago to 66⅝ last Saturday, while Steel preferred advanced from 106½ to 113.

Inland Steel Co.'s Report

Directors of the Inland Steel Co., at their regular meeting in Chicago last week, declared a cash dividend of 2 per cent, payable Sept. 1 to stock of record Aug. 10. The last two quarterly payments were at the rate of 1 per cent. Prior to that 1¾ per cent was the regular quarterly rate.

An excellent showing for the fiscal year ending June 30, 1915, was made by the company. Net earnings amounted to $2,041,248, as against $1,637,172 for 1914. After deductions, net profits for the year amounted to $1,754,174 as against $1,428,648 last year. Surplus for the year amounted to $956,293 as against $550,284 at the time the previous annual report was made public. This brought the total surplus up to $6,251,314. After providing for a stock dividend of $1,993,332 and deducting discount and expense in connection with extension and refunding mortgage, the total surplus as of June 30, 1915, stood at $4,225,812, which compares with $5,295,021 on June 30, 1914.

A comparative income account and balance sheet follows:

	1915.	1914.
Net earnings	*$2,041,248	$1,637,172
Other income	40,310	40,484
Total profits	2,081,558	1,677,656
Prov. for deprec., etc.	200,000	200,000
Prov. for exh. of min.	127,384	49,008
Net profits for year	1,754,174	1,428,648
Interest on bonds	357,390	320,450
Dividends	440,490	557,914
Surp. for year	956,293	550,284
Prev. surplus	5,295,020	4,786,413
Less stock div. paid	1,993,331	.....
Less disc. and exp. in connect'n with exten. and refund'g mort.	32,170	.....
Surp. June 30, 1915	4,225,812	5,295,021

*After deducting charges amounting to $1,129,803.

ASSETS.

	1915.	1914.
Land, plants, etc.	$17,261,796	$15,987,390
Inventories	3,139,359	2,839,015
Bills receivable	177,264	84,243
Accounts receivable	1,591,894	1,541,567
Insurance unexpired	9,146	10,584
Cash	847,983	578,334
Deferred charges	15,766	34,845
Total	$23,043,212	$21,075,978

LIABILITIES

Capital stock	$9,909,681	$7,910,342
Bonded debt	6,410,000	5,600,000
Special deposits	.....	70,357
Accounts payable	732,387	774,116
Pay rolls	174,942	188,451
Surplus	4,225,812	5,295,020
Taxes accrued	130,170	59,896
Interest accrued	29,250	31,500
Reserves	1,430,967	1,146,296
Total	$23,043,212	$21,075,978

Financial Notes

The Pressed Steel Car Co. has declared the regular dividend of 1¾ per cent on the preferred stock, payable Aug. 25, to holders of record Aug. 4. Books reopened Aug. 25.

Frank C. Smith Jr., and Thomas H. Gage have been appointed trustees in bankruptcy of the National Mfg. Co., Worcester, Mass., wire goods. The next meeting of creditors will be held Sept. 30.

The Standard Sanitary Mfg. Co., Pittsburgh, has declared the regular

quarterly dividends of 1¾ per cent on the preferred and 1½ per cent on the common stocks, payable to holders of record July 22.

The Aetna Trust & Savings Co., Indianapolis, has been named temporary receiver of the Standard Tool & Mfg. Co., Indianapolis, by Albert Rabb, referee in bankruptcy. The petition for a receiver was filed recently in federal court, and at the same time creditors filed a petition in involuntary bankruptcy against the company. Both petitions were referred to Mr. Rabb in the absence of Judge A. B. Anderson.

Commercial failures last week in the United States, as reported by R. G. Dun & Co., numbered 375, against 411 the previous week and 325 the corresponding week last year. Failures in Canada numbered 50, against 49 the previous week and 42 last year. Of failures last week in the United States, 124 were in the east, 118 south, 84 west and 49 in the Pacific states, and 127 reported liabilities of $5,000 or more, against 142 the previous week.

Will Add Open Hearth Furnace

The N. & G. Taylor Co., Philadelphia, will make another increase in its steel-making capacity at its Cumberland, Md., plant. It is now asking for bids on another open hearth furnace and other equipment made necessary by the increase in its steel output. Six months ago, the company completed extensive additions to its open hearth department. Practically the entire output of the company has been sold for the remainder of this year, and this is due almost entirely to increase in domestic business, as it has taken no war orders and its export sales are a very small part of the total business.

The Homestead Valve Mfg. Co., Inc., Pittsburgh, Pa., which recently increased its capital stock from $50,000 to $125,000, advises through W. R. Schuchman, secretary and treasurer, that at the present time $75,000 of this increased stock will be issued. This is being done to readjust the company's finances merely and present improvements or additions to the plant are not planned. However, it expects to make some changes; its line of valves will be increased and if the addition prove what the company expects, more plant facilities will be needed.

In San Francisco

Electrochemical Society Will Meet in September

The September meeting of the American Electrochemical Society will be held in San Francisco, from Thursday, Sept. 16, to Saturday, Sept. 18. Special transportation facilities have been arranged for by a committee of which J. M. Muir, 239 West Thirty-ninth street, New York, is chairman. Various routings are offered and full particulars can be obtained by addressing Mr. Muir. The regular society train will leave New York Saturday, Sept. 11, and the special engineers' train on Thursday, Sept. 9.

At the time of holding the meetings, the American Institute of Mining Engineers and the American Institute of Electrical Engineers will also be in session, and joint meetings have been arranged with these societies for Friday, Sept. 17. During the following week, the International Engineering Congress will hold its meetings.

Meetings and Papers

The following list of papers have been accepted to date and will be presented by members of the society at the time specified below:

Thursday, Sept. 16.

Regular meeting of the American Electrochemical Society.

W. D. Bancroft: "The Peptonization of Chromium Oxide". Dealing with the clearing up of solutions of chromium oxide by the action of certain chemicals which de-coagulate the solution.

F. M. Frederiksen: "Electrochemical Synthesis of Phenol Hydroxyl Amine". An application of electro-chemistry to the production of an organic chemical.

A. G. Betts: "Electrolytic Antimony Refining". Record of experiments to refine commercially impure antimony, by the use of various solutions and varying current densities.

C. W. Bennett, Rose and Tinkler: "Electrodeposition of Nickel". Discussion of the conditions of depositing adherent nickel plating, and the use of rotating cathodes in the operation.

W. D. Bancroft: "Electromotive Forces". A review of the fundamental formulas of electromotive force and amendment of the fundamental Nernst equation, deriving it also from a more general standpoint.

Wills and Schuyler: "Heat Losses from an Electric Steel Furnace". An investigation of the heat losses by gases issuing from the doors, by water cooling of the electrode collars, and by transmission through the electrodes.

W. R. Mott: "Use of the Flame Arc in Paint and Dye Testing". An extended investigation of the light value of the white flame arc, arrangements for testing paints and dyes therewith, and results obtained.

R. S. Bosworth: "Collection of Radium Emanation and Its Application for Therapeutic Use". A short review of the modern hospital practice of collecting emanation and applying it.

F. T. Snyder: "Electric Steel Costs". An analysis of the cost of making electric steel from cold raw materials on a small scale for foundry use.

Friday Morning, Sept. 17.

Joint session with the American Institute of Mining Engineers. The papers to be presented by the A. E. S. will be of mutual interest to both societies.

R. S. Wile: "Melting of Ferro-Alloys in the Electric Furnace." A discussion of the economy in steel making practice of melting ferro alloys, particularly ferro manganese, in electric furnaces and adding them melted to the steel.

L. Addicks: "The Electrolysis of Copper Sulphate Liquors Using Carbon Anodes". An extended account of recent experiments in leaching copper ores in Arizona, and of the successful use of carbon anodes in electrolyzing sulphate solutions.

F. R. Pyne: "Solution Stratification as an Aid to the Purification of Electrolytes". Description of a new method of withdrawing liquor low in carbon from the regular refining baths, by various outlets properly placed.

Other papers will be presented by members of the American Institute of Mining Engineers.

Friday Afternoon, Sept. 17.

Joint session with the American Institute of Electrical Engineers. The papers to be presented will be of mutual interest to both societies.

F. M. Sebast: "Electrical Resistance of Copper-Nickel-Chromium alloys". Records an investigation of the resistances of alloys of copper with chromium, alloys of nickel with chromium, and ternary alloys of the three metals.

J. W. Beckman: "Electro-chemical Possibilities on the Pacific Coast". A complete discussion of the location and cost of power supply of raw materials and possible markets for electro-chemical products manufactured on the Pacific coast.

Saturday, Sept. 18.

Special arrangements have been made for members to visit mining, metallurgical, hydro-electric, and various other engineering operations in California.

Superior Will Celebrate

Superior, Wis., Aug. 3. — Judge Elbert H. Gary, chairman of the United States Steel Corporation, and Gov. Emmanuel L. Philipp, of Wisconsin, have been invited to deliver addresses at the celebration to be held in Superior on Nov. 1, when the new plant of the Minnesota Steel Co. on St. Louis river, between Duluth and Superior, is scheduled to be opened formally. Superior civic bodies are working on elaborate arrangements for the celebration.

The addition to the building used as the foundry department of the Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., is finished and will give employment to about 50 additional hands.

The Dilley Foundry Co., Pine Bluff, Ark., has completed erection of its plant and expects to start operating shortly.

War Demand Breaks All Records

Sales of Tools to Agents of Belligerent Governments Limited Only by Supply—Second Hand Machinery Goes Fast—Plants Are Enlarged

IT PROBABLY is no exaggeration to state that the export demand for machine tools now is more active and urgent than at any time since the outbreak of the war. Inquiries direct from abroad, and from agents or representatives of foreign concerns in this country are flooding the dealers and manufacturers. One inquiry, put out by a representative of the British war department, who temporarily is staying at one of the hotels in New York, involves about 1,000 tools, including lathes, slotters, small milling machines, Lincoln millers, etc. The Michelin Tire Co., Milltown, N. J., has been inquiring far and wide for all kinds of machine tools for shipment to France. Most of the forwarding agents in New York City have put out inquiries involving large numbers of tools. As a result of this tremendous demand, the trade is sold up very far ahead on certain classes of machinery. One large dealer in New York, for instance, cannot now take any further orders for automatic screw machines, certain kinds of grinders, etc., for delivery sooner than nine months. The larger portion of the export demand remains unfilled, due to the impossibility of securing early deliveries, and it seems likely that much of this business will continue to go begging, since the buyers naturally hesitate to commit themselves as far ahead as the dealers and manufacturers are forced to ask.

Further large purchases by domestic manufacturers of war munitions featured the week just closed, but details are withheld owing to the fact that the negotiations are not yet entirely closed. Among concerns which are reported as having booked large new war contracts are the Garland Corporation, Pittsburgh, and the Sturgis & Burns Mfg. Co., Chicago. The Westinghouse interests announce having received another large rifle contract. The New England Westinghouse Co. has let contracts for four new buildings to be equipped for turning out rifles. Another concern which is enlarging its plant to turn out war munitions is the Bartlett-Hayward Co., Baltimore.

Domestic demand for machine tools in the east, not including war orders, is rather slack and no inquiries of importance are reported. The American Smelters Securities Co., 120 Broadway, New York, is in the market for a pair of bending rolls for export to Chile. It is expected this interest will buy a great deal of equipment shortly for the development of its copper properties in Chile. The American Smelting & Refining Co., 165 Broadway, New York, has increased its crane inquiry by inquiring for two more cranes, making a total of six for which it is in the market. Among concerns in the east who are expanding their plants or adding to their equipment are Gooley & Edlund, Cortland, N. Y.; the Buffalo Bolt Co., Buffalo; the Benford Mfg. Co., Mount Vernon, N. Y.; the Erie Stove Mfg. Co., Erie Pa.; the Globe Malleable Iron & Steel Co., Syracuse, N. Y.; Smith & Winchester, South Windham, Conn.; the Chevrolet Automobile Co., Tarrytown, N. Y.; John A. Roebling's Sons Co., Trenton, N. J.; Heald Machine Co., Worcester, Mass.; Lenox Motor Co., Hyde Park, Mass.; J. N. Lapointe Co., New London, Conn.; Maryland Steel Co., Sparrows Point, Md., and others. The American Enamel Mfg. Co., 171 Madison avenue, New York, has purchased the old Colwell Lead Co. plant at Elizabeth, N. J., and will erect new buildings for the manufacture of cast iron pipe and fittings, enamel bath tubs, etc.

Plan Additions at Cleveland

SEVERAL Cleveland machine tool manufacturers are making or contemplating enlargements of their capacities. Among those who have recently added installations are the Foote, Burt & Co. and the Warner & Swasey Co. The Hydraulic Press Mfg. Co., Mt. Gilead, O., has just bought three lathes, and the United Steel Co., Canton, O., has added a lathe and a radial drill to its equipment.

Cincinnati Builders Plan Large Extension

AN INQUIRY for $45,000 worth of lathes from the French government is still before the Cincinnati market, but makers in Cincinnati cannot specify immediate delivery, which is wanted. The machine tool market in Cincinnati is quiet, as all shops have full order books for several months, and are not actively soliciting new business. Machine tool inquiries are usually for prompt deliveries, which are hard to obtain at present. The R. K. LeBlond Machine Tool Co. is contemplating building one of the largest machine tool plants in the world in Hyde Park, a suburb and is having preliminary plans prepared for a building containing 500,000 square feet of floor space.

Idle Plants in West Dismantled

STOCKS of machine tool dealers in Chicago have been depleted more than ever before in the history of the business. Most sellers have disposed of practically everything in certain lines and are unable to replenish their supply. In a number of cases machines bear "sold" tags, but cannot be boxed and prepared for shipment fast enough to keep up with the selling.

One dealer has disposed of an additional number of second hand lathes to a buyer who ships them to England and the same buyer has picked up other tools which will be combined to make a large shipment. A representative of Barwood & Richards, of Philadelphia, has been here recently and has bought considerable machinery for shipment to Europe. The Crocker-Wheeler Co., at Ampere, N. J., recently purchased a large turret lathe from a Chicago concern.

One of the interesting events of the week was the purchase by the E. L. Essley Machinery Co., of Chicago, of all the machinery of the Wisconsin Engine Co., Corliss, Wis. This machinery was sold conditionally by the Essley company to an eastern company before the deal was closed at Corliss. The equipment included about 25 lathes, up to 30-inch swing and one of 60 inches. Practically the entire equipment will be prepared and shipped east immediately.

The nameless company which proposes making war munitions, to which reference has been made several times recently, continues to buy much machinery, and

The NATIONAL TRANSIT CO.
OIL CITY, PA.

This Shows How a Difficult Floor Problem Was Solved

¶ You can see what kind of service is required from this floor in the plant of the National Transit Co., manufacturers of pumps, engines, oil well supplies, etc. It must carry great loads, withstand piling of heavy material and continuous hard trucking.

¶ The brick floor previous to this one completely wore out, reducing shop efficiency as it deteriorated and making undue repair expense necessary.

¶ Such conditions of service could be successfully and permanently met only with an

AYER & LORD
INTERIOR WOOD BLOCK FLOOR

THIS SHOWS HOW THESE BLOCKS ARE LAID. THE FLOOR BECOMES IRONED OUT BY USE INTO A DENSE, SOLID, SMOOTH UNIFORM MASS.

¶ Unlike any other flooring material Ayer & Lord Interior Wood Blocks become firmer, smoother, stronger the heavier and harder the usage they receive. They will not crack, crumble, or corrugate—great loads will not affect the floor level.

¶ Think how such a floor cuts down truck labor—of the advantages obtainable from a floor that is dustless and noiseless — comfortable to work on — a non-conductor of cold and heat—a non-reflector of light. How it reduces liability to accident and minimizes damage to tools and castings caused by careless handling.

¶ Apply the experience of these manufacturers to improve conditions in your own plant. You'll discover that your floor problems can be answered in the same way.

Ayer & Lord Wood Block Floors have proved they—
—Carry the heaviest loads
—Stand the hardest wear
—Resist fire and heat
—Don't swell or buckle
—Don't damage tools
—Are dustless, noiseless, dry and sanitary
—Easy on the feet.

Write us for new booklet "FLOORS."—It contains further information — photographs of installations of every character. Tell us something of your problems —our Engineering Department will gladly advise and specify to suit your conditions without any obligation being incurred.

Ayer & Lord Tie Co.
General Office: Railway Exchange, Chicago

CLEVELAND, OHIO
926 Illuminating Building
KANSAS CITY, MO.
1117 Rialto Building
MEMPHIS, TENN.
142 Exchange Building
PHILADELPHIA, PA.
319 Perry Building

AYER & LORD TIE CO. INCORPORATED — AYER & LORD INTERIOR WOOD BLOCKS — RAILWAY EXCHANGE, CHICAGO

it develops that instead of it being a new company, the buying is being done for an established concern, one of the largest in the country which remains anonymous for reasons of safety. The new machinery recently bought is being installed in a new plant recently completed. The Santa Fe Railway Co. continues to buy an occasional tool but has not shown any signs of taking the assortment inquired for in its recent list. Domestic demand not relating to war business has not assumed large proportions.

EASTERN STATES

PORTLAND, ME.—Massachusetts Forging Co. has been incorporated; $25,000 capital stock; by Roland H. Boutwell, president, Exeter, N. H.; Charles L. Hutchinson, Portland, Me., and Constant Southworth, treasurer, Portland, Me.

BOSTON.—Calumet & Hecla Mining Co. has resumed all construction work at its various mines which was dropped at the commencement of the war.

SPRINGFIELD, MASS. — New England Westinghouse Co. has awarded contract to the Fred T. Ley Co., Springfield, Mass., for the erection of four new buildings, to cost approximately $400,000. These will be used for extending the manufacture of rifles, etc.

BRIDGEPORT, CONN. — Bridgeport Brass Co. which let contract to American Bridge Co. for a new concentrator building and boiler house, is having plans drawn for a new foundry building.

HARTFORD, CONN. — Whitney Mfg. Co. has commenced work on the construction of a new building, four stories, 60 x 64 feet.

NEW LONDON, CONN.—J. N. Lapointe Co. has started work on a 2-story, 28 x 60-foot addition.

PLANTSVILLE, CONN.—Rowe Calk Co. has commenced work on an addition to its plant.

STAMFORD, CONN.—Richards & Co. have been granted a permit for erecting two additions, 65 x 223 and 65 x 133 feet, respectively, both one story.

WATERBURY, CONN.—Waterbury Rolling Mill has let a contract for a 1-story, 32 x 150-foot addition.

WINDHAM, CONN.—Smith & Winchester Co., South Windham, will build a 1-story, 69 x 85-foot foundry in Windham. Adolph Suck, 97 Arlington street, Hyde Park, Mass, is the architect.

BUFFALO, N. Y. — Schoellkopf Aniline Chemical Co. will erect a 3-story brick factory to cost $67,000.

BUFFALO, N. Y. — Buffalo Bolt Co. plans to erect an addition for drawing wire and rolling wire rods.

BUFFALO, N. Y. — Buffalo Aniline & Chemical Co., Abbott road, has let contract for a new 3-story, 80 x 300-foot chemical works.

CORTLAND, N. Y.—Gooley & Edlund have let contract for a new machine shop addition, one story, 60 x 106 feet. This company is inquiring for some machine tool equipment.

ELMIRA, N. Y.—Morrow Mfg. Co. is taking bids for the erection of a new heat treatment building. This company just has completed the purchase of a large amount of machine tool equipment.

LONG ISLAND CITY, N. Y.—Texas Oil Co. has filed plans in Long Island City for the erection of the first unit of its new distributing plant, to be located at Marsh street and the Long Island railroad.

NEW YORK.—W. E. Welborne, staying at the Hotel McAlpin, is purchasing a large amount of equipment for export to Russia.

NEW YORK.—Southern Pacific railroad, in addition to the inquiries recently mentioned, is in the market for a wheel press.

NEW YORK.—American Smelters Securities Co., 120 Broadway, New York, is in the market for a pair of bending rolls for export to Chile.

NEW YORK.—American Smelting & Refining Co., 165 Broadway, has put out inquiries for two more cranes, making a total of six for which it is in the market.

NEW YORK. — Pocohontas Fuel Co., 1 Broadway, has purchased a wharf in Portland, Me., and plans to equip it with a coal unloading plant which will have capacity for handling 5,000 tons of coal a day.

NEW YORK. — Chevrolet Automobile Co., W. C. Durant, president, 816 Eleventh avenue, will ask for bids shortly on a 2-story, 40 x 60 foot addition to be erected at the plant at Tarrytown, N. Y.

NEW YORK.—National Ordnance Co. has been incorporated to manufacture firearms; $200,000 capital stock; by A. C. Thorne, F. J. MacIntyre and M. J. O'Callaghan, 61 Broadway, New York City.

SYRACUSE, N. Y.—O'Brien Construction Co. has been awarded building contract for a 3-story, brick and mill construction structure, 63 x 183 feet. The building is to be used by S. Shopiro Co.

SYRACUSE, N. Y.—Globe Malleable Iron & Steel Co., Greenway avenue, has plans in progress by Architects Sackett & Park, 34 Security Savings Bank building, for a 1-story, 60 x 90 foot addition to one of the present buildings, and for a 1-story, 60 x 150-foot, stock rack building, a 40 x 60-foot power house, a 1-story, 40 x 90 foot, die sinking shop, a 1-story, 40 x 90 foot, die storage building, a 1-story, 60 x 90-foot, sand blast and pickling room, and a superintendent's office and shipping room. This company has purchased considerable new equipment and still is in the market.

TROY, N. Y.—W. E. Martin & Son will build a 1-story, 41 x 60-foot factory.

BRADFORD, PA.—C. W. Smith, architect, Dunkirk, N. Y., is drawing plans for a new plant to be built at Bradford by the Kendall Refining Co.

CONSHOHOCKEN, PA. — Fire did about $15,000 damage to plant of H. C. Jones, woolen manufacturers. Considerable new machinery and rebuilding of the plant will be necessary.

ERIE, PA.—Ball Engine Works is about ready for bids on the construction of a new boiler house addition.

PHILADELPHIA. — Philips Split Pulley Co., Fourth and Glenwood, considers moving its plant to some other location in Philadelphia. J. J. Mundy is president.

PHILADELPHIA. — Harry Gill Jr., 2515 Germantown avenue, is taking sub-bids on a 3-story, 51 x 120 and 58 x 120-foot machine shop. The owner's name is withheld.

PHILADELPHIA. — Bids will be received for the construction of a steel and concrete bridge, 52-foot roadway, to span railroad tracks at Cambria and A streets. Structure will cost about $62,000.

PITTSBURGH. — Garland Corporation is understood to have booked a large contract for rifles, etc., to be shipped to Russia.

PITTSBURGH.—Bids will be received until noon, (eastern standard time), Aug. 30, by the United States engineer for installation of steel lock gates, valves and lock operating machinery, at Lock 6, Monongahela river.

PITTSBURGH. — Ford Motor Co., Detroit, has decided to double capacity of its assembly plant near Shadyside station; the present plant, five stories, contains 268,000 square feet of floor space. The company will be in the market shortly for a large number of tools, used in the assembling of Ford automobiles.

ST. MARYS, PA.—Speer Carbon Co., capital $200,000, has been incorporated by William Kaul, F. A. Kaul, George C. Simmons, J. S. Speer and G. P. Fryling.

UNIONTOWN, PA.—Dudley Electric & Machine Co., manufacturer of boilers and machinery, has been incorporated; $50,000 capital stock; by W. E. Dudley, Elwood D. Fulton, W. D. Woodruff, J. T. Dudley, Lucy Fulton, Uniontown, and Harry E. Street, Clarksburg, W. Va.

WARDNER, PA.—This city is considering the question of a municipal lighting plant.

YOUNGWOOD, PA. — A company manufacturing iron and steel products, whose name is withheld for the present, is seeking a larger location in Youngwood.

BOUND BROOK, N. J. — Independent Chemical Co., New York, of which Warren C. King, Beechwood Heights, N. J., is president, has taken title to some property here and will erect a new plant.

ELIZABETH, N. J. — Architects Ring, Cleaves, Graham Co., 280 North Broad street, is about ready to take bids on a foundry, pattern shop, plate shop, cradles, office, storage, etc., for a ship building plant to be erected by Samuel L. Moore & Sons Corporation.

ELIZABETH, N. J. — American Enamel Mfg. Co., William S. Kupfer, president, 171 Michigan avenue, New York, has purchased the old plant of the Colwell Lead Co. in Elizabeth. This plant, idle for several months, is on a site of 12½ acres. Plans have been filed for about 12 new buildings to be erected by the American Enamel Mfg. Co., which is to manufacture cast iron pipe and fittings, enamel bath-tubs, sinks and lavatories, etc. John A. Lefferts, formerly suprintendent for the Colwell company, has been engaged as local manager.

MILLTOWN, N. J.—Michelin Tire Co. is inquiring on a large quantity of machine tools for export to France.

NEWARK, N. J.—Columbus Crystal Co., 10 Arch street, has let contract for a 2-story, 80 x 182-foot, chemical factory.

NEWARK, N. J.—J. Wiss & Sons Co. shortly will take bids on 4-story, 50 x 75-foot factory to be used for manufacturing shears, etc.

NEWARK, N. J.—Geo. Stengel, Inc., leather manufacturer, has been granted permits for re-erecting several buildings recently burned. Among the new buildings will be a power plant.

TRENTON, N. J.—DeLaval Steam Turbine Co. has let a contract for a 1-story, 80 x 120-foot addition.

TRENTON, N. J.—Reeves-Cubberley Engine Co. is in the market for about 20 turret lathes to make shrapnel shells.

WILMINGTON, DEL. — Sternianopolus Arms Co. has increased its capital stock from $500,000 to $1,000,000. It is expected a large plant will be erected to handle war contracts.

BALTIMORE.—Maryland Steel Co. will enlarge its ship building capacity at Sparrows Point, including an addition to the machine shop department, etc.

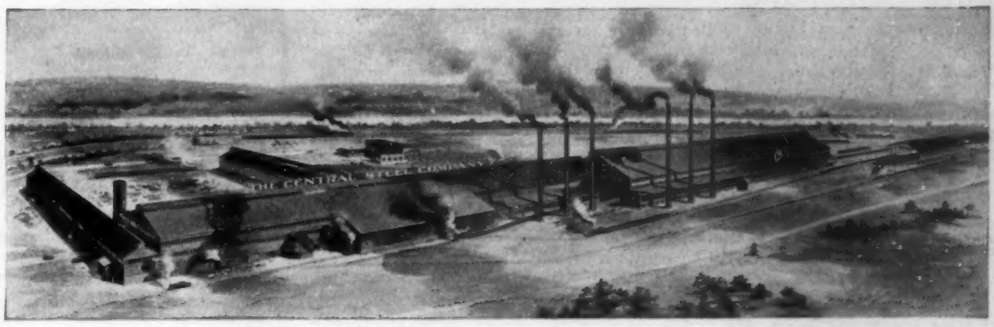
BALTIMORE. — Shawingan Electro-Products Co., of which P. S. Falter, Calvert and German streets, is general manager, has plans under consideration for building a plant.

WASHINGTON.—Bureau of supplies and accounts, navy department, will open bids on Aug. 24 for an 8-inch lathe, a 12-inch

AGATHON AGATHON AGATHON AGATHON

Millions for Better Steel

To insure from the outset the maintenance of the high standards of quality and service set for **Agathon** products, the Central Steel Company has built one of the most complete, up-to-the-minute steel works in the country.



Features of the Central Steel Co's Plant

Three 50-ton Open Hearth Furnaces in operation, with four more under construction.

Present Open Hearth Building 563 feet long and 135 feet wide.

Soaking Pit Facilities to correspond with Open Hearth Capacity.

Open Hearth Furnace Doors and Soaking Pit Covers electrically operated.

100-ton crane in Open Hearth Building.

34-inch Blooming Mill direct coupled to reversing electric motor —largest in America.

All Blooming Mill Auxiliaries driven by motors.

Blooming Mill can roll 600 tons of ingots to 4 x 4-inch billets in 12 hours.

Main motor driven by direct current furnished by motor-generator set fitted with 30-ton fly-wheel.

Bar and Billet Mill adjoins Blooming Mill. Consists of two 3-ft.-high, 24-inch, roll stands and one 24-inch bull head, driven by one 1500 H. P. and one 300 H. P. motor.

Laboratory — One of the most modern in the country. Every facility for chemical and physical tests.

Every auxiliary facility.

This Plant rolls the kind of Steel YOU want

THE CENTRAL STEEL CO.

MASSILLON, OHIO

AGATHON AGATHON AGATHON AGATHON

lathe, hand millers, vertical millers, a 2-spindle drill press and a 1-spindle drill press.

WASHINGTON.—Engineers' Depot, U. S. Army, Washington Barracks, will open bids on Aug. 16 for one 24-inch and one 14-inch lathe, one 16-inch shaper, one 28-inch drill and one sensitive drill.

CENTRAL STATES

BALTIMORE, O. — Bartlett-Hayward Co., which has booked a large war order, has let contract for the construction of several new buildings.

CELINA, O.—J. H. Meyer, county engineer, will prepare plans for four plate girder bridges to span the canal at New Bremen, O. Structures probably will be similar in type and will cost about $35,000.

CINCINNATI. — Instantaneous Glue Converter Co., Montgomery road, will need special equipment for manufacturing a special devise to be marketed for manufacturing glue.

CINCINNATI.—Ice making equipment will be needed by the City Ice Deilvery Co., which will build a 75-ton ice plant on Price Hill, a suburb. The cost of the improvement will be $75,000.

CINCINNATI. — William Koehl Co., of Jamestown, N. Y., has contract for erecting 4 story, concrete and steel factory building, 100 x 100 feet, to be located on Hulbert street.

CINCINNATI. — R. K. LeBlond Machine Tool Co. considers the erection of one of the largest machine tool plants in the world, on the Norfolk & Western railroad in Hyde Park, a suburb. Zettle & Rapp, architects, Cincinnati, are preparing preliminary plans for the first building which will contain 500,000 square feet of floor space.

CLEVELAND.—Lederer Milling Co. plans $200,000 flour mill.

CLEVELAND.—DeHamel Construction Co. has been incorporated; $10,000 capital stock; by John B. DeHamel, B. Cowell, Arthur F. May, L. Henegan and W. H. Nye.

CLEVELAND. — The county commissioners will receive proposals marked "Proposal for construction of steel deck bridge repairs, per report No. 3553" until 10:00 o'clock, A. M., (central standard time), Aug. 18.

CLEVELAND HEIGHTS, O.—Bids will be received until Aug. 16 for constructing 1,258 feet of 12-inch water main. H. H. Canfield, clerk.

COLUMBUS, O. — Utilities comission has authorized Mutual Electric Co., of Middleport, O., to buy light plant of Franke C. Elliott, upon which $40,000 will be spent for improvements.

COLUMBUS, O. — Franklin County Construction & Equipment Co. has been incorporated; $10,000 capital stock; by Charles E. Belcher, Howard C. Goodman, H. H. Delorme, R. J. O'Donnell and Blanche G. Guest.

CONNEAUT, O.—Pittsburgh & Conneaut Dock Co. is planning to enlarge its ore handling facilities in Conneaut by installing two more unloaders each having a 15-ton bucket.

DAYTON, O.—National Automatic Refrigerating Co. has been incorporated; $100,000 capital stock; by The Wood Oakland Co., Cincinnati, L. O. Casey and others.

ELYRIA, O.—Elyria Machine Co. has been incorporated; $100,000 capital stock; by R. A. Greene, Thomas R. Hird, E. A. Peters, E. N. Conrad and C. DeWitt.

FREMONT, O.—Bulford Auto Truck Co., manufacturing motor ambulances, will erect an addition.

KENTON, O. — Frank L. Ridenbaugh is erecting a cold storage plant, to cost $15,000 with equipment.

LORAIN, O.—Brenbunfers Engineering Co. has been incorporated; $60,000 capital stock; by Thomas M. Brennan, J. C. Reasner, W. H. Dettelbach, M. M. Dewitt and E. J. Albl.

MARION, O.—Clifford Owen announces the plant of the Marion National Mill Co., recently damaged by fire, will be rebuilt. Flour machinery will be required.

MT. GILEAD, O.—C. O. Higgins, county auditor, will open bids Aug. 20 for sub and superstructure of a 124-foot bridge, with 16-foot roadway, block floor.

STEUBENVILLE, O.—Bids will be opened Aug. 29th for constructing the Harpersville bridge; also for repairing bridge at the east end of Dillonvale. John L. Means, auditor.

TOLEDO, O.—The Standard Elevator Warehouse Co. has been incorporated; $10,000 capital stock; by Charles I. Barnes and others.

WARREN, O.—Bids will be opened Aug. 23d by the county auditor for Summit street bridge.

YOUNGSTOWN, O. — Stader Construction Co. changes its name to the Stader-Conrath Construction Co.

YOUNGSTOWN, O.—Liberty Water Co. has been incorporated; $300,000 capital stock, by W. L. Robinson and others.

LEXINGTON, KY.—The commissioners of Fayette and Madison counties are planning a $150,000 bridge over the river from Lexington to Richmond.

LOUISVILLE, KY.—The name of the Maguire & Comstock Machine Co. has been changed to the Louisville Elevator & Machine Co.

MIDDLESBORO, KY. — Middlesboro Electric & Auto Works has been incorporated; $5,000 capital stock; address J. L. Manring.

BEDFORD, IND.—The county commissioners will meet shortly to order the rebuilding or repairing of about eight bridges washed out by a flood.

COLUMBUS, IND.—Dore Ogden, a local manufacturer, plans a factory for manufacturing shrapnel.

CRAWFORDSVILLE, IND.—County council has appropriated $4,000 for rebuilding Remley bridge over Offield creek.

FT. WAYNE, IND.—The name of the H. G. Raymond Co. has been changed to the Schiefer Automobile Co., Inc.

FT. WAYNE, IND. — Laundry machinery will be required by the Banner Laundring Co., recently incorporated with a capital stock of $25,000. The directors are O. C. Leggett, A. V. Leggett and A. T. Bailey.

FORT WAYNE, IND. — Board of public works has asked the Pennsylvania and Wabash railroads to submit plans by Aug. 21 for four viaducts as part of the grade separation work now being carried on.

INDIANAPOLIS.—Wilson Window Guard Co. has changed its name to Diamond Iron & Wire Works.

INDIANAPOLIS.—Jenney Shock Absorber Co. has been incorporated; $15,000 capital stock; by G. R. Conner, R. R. Carter and J. Carter.

INDIANAPOLIS. — Davis Duplex Moving Picture Machine Co. has been incorporated to manufacture motion picture machines; $25,000 capital stock; by H. E. Retty, John McFellery and others.

INDIANAPOLIS. — Hert Mfg. Co. has been incorporated to manufacture air pumps and automobile supplies; $15,000 capital stock; by H. J. Hert, W. A. Rockenfield and J. G. Foorster.

INDIANAPOLIS.—Contract will be awarded soon for a $100,000 6-story, brick and steel business building in South Meriden street for John B. Bright & Son, 221 East Maryland street.

INDIANAPOLIS.—T. Madden Sons & Co., Fletcher avenue, lounge manufacturers, are to build a machine shop, one story, 55 x 98 and 22 x 78 feet. Bids are being taken by S. A. Hastings, architect, 332 Farmers Bank building.

MADISON, IND.—Klein & Anger, are building a foundry and buying equipment.

MILLERS, IND.—The town board has decided to install a $14,000 water works system, water to be obtained from the mains of the Gary Heat & Water Co. at Aetna.

REDKEY, IND. — Redkey Water Works Co. has sold $10,000 worth of bonds for the erection of a water works system.

TERRE HAUTE, IND.—The county commissioners have decided on the construction of the proposed Honey creek bridge on the Rigney road. Commissioner Cullen says five bridges will be required next year.

VAN BUREN, IND.—Bonds for $12,000 have been voted for a municipal water works plant.

BLOOMINGTON, ILL. — Illinois Central railroad, A. S. Baldwin, chief engineer, Chicago, has submitted plans for about $400,000 worth of subway and viaduct track work.

CHICAGO.—Oxweld Railway Sales Co. has increased its capital stock from $100,000 to $600,000.

CHICAGO.—Sturgis & Burns Mfg. Co. is understood to have closed an order for 1,250,000 brass cases for shrapnel.

CHICAGO.—Western Plumbing & Supply Co., 119 North Desplaines street, is taking bids on a $50,000 2-story foundry and warehouse, 124 x 125 feet. William F. Burfeind, architect, 28 East Jackson boulevard.

CHICAGO.—Bids will be received until Aug. 15, by W. R. Moorhouse, 407 City Hall, for a 20-ton, electric traveling crane, with 5 ton auxiliary hoist, at the Mayfair pumping station.

CHICAGO. — Klunk Unit Stove Co. has been incorporated to manufacture collapsible stoves; $25,000 capital stock; by Albert J. Klunk, Harry J. Hungerford and Arthur L. Hoffman.

CHICAGO. — Henry L. Newhouse, 4630 Prairie avenue, Chicago, is planning to build a $1,400,000 hotel at Grand boulevard and Fifty-first street. It will be in two units, one 4 stories and the other 10 stories.

CHICAGO. — Joy Morton, Railway Exchange building, Chicago, has bought the Times building at Fifth avenue and Randolph street and plans to spend $1,000,000 for a steel office building on this site as soon as present leases expire.

DANVILLE, ILL.—Hegeler Zinc Co. has increased its capital stock from $300,000 to $600,000.

ELGIN, ILL.—Stevens Vacuum Huster Co. is to build a $50,000 plant.

O'FALLON, ILL. — Fire damaged the japanning and paint departments of the Willard Range Co. to the extent of $5,000.

SPRINGFIELD, ILL. — Illinois industrial home for the blind will receive bids until 3:00 p. m., Aug. 16, for a tank and pumping system.

URICH, ILL. — Urich Electric Light & Power Co. has been incorporated; $5,000 capital stock; by J. J. Wright, Henry Buesse and R. T. Miller.

WAUKEGAN, ILL.—The city plans buying high pressure boilers for its pumping station W. L. Rogers, clerk of board of local improvements.

BATTLE CREEK, MICH. — Nichols & Shepard Co., manufacturer of threshing machines, is planning to add to its plant late this fall. A large loading crane is one of the improvements.

DETROIT.—Michigan Steel Casting Co. has increased its capital stock from $210,000 to $280,00.

DETROIT. — Parrott Heater Co. has been incorporated; $3,000 capital stock; by V. Bennett, Frank Bennett and George W. Frendle.

DETROIT.—Charcoal Iron Co. of America

has increased its capital stock from $7,989,600 to $8,056,600.

DETROIT. — Pigott-Healy Construction Co. has been incorporated; $50,000 capital stock; by Joseph M. Pigott, Frederick E. Healy and Charles J. McCollum.

DETROIT.—Boerder Process Steel Co., has been incorporated to manufacture steel; $15,000 capital stock; by Harry E. Schiller, C. G. Lordorf, Detroit; Anton Boerder, Toledo.

DETROIT.—Giern & Anheltt, manufacturers of machinery and tools, have bought a building, two stories, 52 x 127 feet, which will be remodeled and enlarged to provide double the present capacity of the firm's plant.

DETROIT.—Plans are being prepared to combine the Fort street and the D. M. & T. interurban line bridges over the River Rouge into a large lift bridge. The electric line bridge is 300 feet east of the highway span, and new structures will be necessary if the river is dredged.

DETROIT.—W. C. Durant, president, and A. B. C. Hardy, of Chevrolet Motor Co., announce Chevrolet Motor Co. of Canada, Ltd., will be organized; $500,000 capital stock; and a plant, employing 500 men, will be erected at Toronto. The output will be 15,000 cars a year.

FLINT, MICH.—Mason Motor Co., whose capital stock has been acquired by the Chevrolet company, has broken ground for a 1-story, 150 x 616-foot factory building. The company manufactures motor used in Chevrolet cars.

JONESVILLE, MICH.—George L. Rock is to build a plant to manufacture self starters for automobiles.

KALAMOZOO, MICH. — The city council plans a special meeting to be held in the latter part of the summer to arrange for the erection of a $1,000,000 gas plant.

LANSING, MICH.—Reo Motor Car Co. is about to add three buildings to its plant at a cost of $250,000.

MENOMINEE, MICH. — W. J. Sherman Co., Nasby building, Toledo, O., engineer, is preparing an estimate on the cost of a municipal water works system.

PORT HURON, MICH.—South Park Machinery & Supply Co. has been incorporated and will take over the business of the South Park Mfg. Co., operating a brass foundry and machine shop. The incorporators are S. F. Connor, E. V. Vanness and E. L. Moak.

SAGINAW, MICH.—Jackson-Church-Wilcox Co., North Hamilton street, is to build a 1-story addition, 60 x 100 feet and a 2-story addition 48 x 65 feet both of brick and steel.

APPLETON, WIS. — Wisconsin Traction, Light, Heat & Power Co., Appleton, Wis., operating electric light and central heating utilities throughout the Fox river valley, has engaged Woodmansee & Davidson, consulting engineers, Chicago and Milwaukee, to make plans and superintend the erection and equipment of a steam power plant addition, 75 x 100 feet. The Appleton company is expending about $350,000 in increasing its facilities in both steam and hydroelectric plants. E. J. Ellis is general manager.

EPHRAIM, WIS.—Ephraim Electric Light Co. has been incorporated with $4,000 capital to provide the village with an electric light and power system. The promoters are F. Hogenson, H. A. Anderson, E. Hilgeson, O. M. Olson and C. S. Smith.

KAISER, WIS.—Plans are being prepared for rebuilding Blackwell & Kaiser company's sawmill, recently damaged by fire to the extent of $5,000.

MADISON, WIS.—Madison Gas & Electric Co. awarded the contract for the erection of a power transmission station on Blount street to the T. C. McCarthy Co., Madison, at $17,000. Current is derived from a mammoth hydroelectric plant on Wisconsin river at Kilbourn City, Wis.

MILWAUKEE. — Milwaukee, Coke & Gas Co. will start work at once on a $12,000 power plant in Greenfield street.

MILWAUKEE. — Fitzsimmons Steel Products Co. has been incorporated at $40,000 by Edward L. Wolff, Ernest Prinz and George H. Gabel, attorney. Details are withheld for the present but announcement is promised soon.

MILWAUKEE.—Enterprise Iron Works has been organized by Robert Wettstein, and Carl Broenen, both of this city. The new firm has leased the shop buildings at 240 250 Madison street and will manufacture and design structural steel, ornamental iron, brass and bronze work.

MILWAUKEE. — Gas Power Engineering Co., North avenue and Second street, Milwaukee, is increasing its floor space 33⅓ per cent by the erection of a complete third floor, 50 x 150 feet. Klug & Smith, Milwaukee consulting engineers, are in charge of the work.

MILWAUKEE.—A total expenditure of $1,279,646 for equipment machinery, transmission lines, etc., for accommodating a 8,500 lamp street lighting system is recommended in the report of the Milwaukee street lighting survey. The system is to be installed by the close of 1917. Current is to be purchased, doubtless, from the Milwaukee Electric Railway & Light Co. The survey was made by Vaughan, Meyer & Sweet electrical engineers, Majestic building, Milwaukee. It is believed likely the common council will concur in the recommendations. F. G. Simmons is commissioner of public works.

MONTICELLO, WIS.—Edw. Wittwer & Bro., are preparing plans for the erection of a $30,000 cold storage and refrigerating plant in Monticello.

PLATTEVILLE, WIS. — Marshall Ware Development Co., Hazel Green, Wis., a lead and zinc mining operator in this vicinity, has increased its capital stock from $10,000 to $50,000.

RACINE, WIS.—American Skein & Foundry Co. is building a $10,000 addition to its plant.

RACINE, WIS.—George W. Jagers Mfg. Co., builder of gasoline engines and automobile motors, is said to be undergoing reorganization and probably will reopen shortly to fill pending contracts.

RACINE, WIS.—E. R. Harding Co., general contractor, Racine, is reported lowest bidder on a $225,000 sewerage project at Peoria, Ill., embracing 20 miles of sewer requiring five carloads of manholes, covers and other castings.

WITTENBERG, WIS. — Bonds for $12,000 have been sold and the proceeds will be used for a municipal water works system.

BOONVILLE, MO.—Boonville Light, Heat & Power Co. has been incorporated; $75,000 capital sotck; by W. A. Somhart, B. A. Somhart and W. E. Somhart.

CAMPBELL, MO.—Campbell public service commission plans to build an addition to its power house and install a boiler and corliss steam or oil engine.

CASSVILLE, MO.—Apex Mining Co. is advertising for the construction of a concentrating plant near Cassville.

PEVELY, MO.—W. T. Donnell is planning to erect a plant to manufacture iron gates.

SARCOXIE, MO.—Plymouth Smelting Co. is making additions to its plant, including five boilers, blacksmith shop and a 350-ton mill, at a cost of $40,000.

SEDALIA, MO.—City Light & Traction Co. is to install a 200 watt 2-phase, rotary converter and will rebuild the distribution system.

ST. JOSEPH, MO. — Samuel Stone is

TIMELY TIPS TO THE TRADE

A few bright and shining stars in this week's new business firmament.

Trot out your wagon and HITCH UP.

R. K. LeBlond Machine Tool Co., Cincinnati, considers the erection of one of the largest machine tool plants in the world, on the Norfolk & Western railroad in Hyde Park, a suburb. Zettle & Rapp, architects, Cincinnati, are preparing preliminary plans for the first building which will contain 500,000 square feet of floor space.

Pittsburgh & Conneaut Dock Co., Conneaut, O., is planning to enlarge its ore-handling facilities by installing two more unloaders, each having a 15-ton bucket.

Gooley & Edlund., Cortland, N. Y., are inquiring for some machine tool equipment for a machine shop addition.

Michelin Tire Co., Milltown, N. J., is inquiring on a large quantity of machine tools for export to France.

Southern Pacific railroad, New York City, in addition to the inquiries recently mentioned, is in the market for a wheel press.

American Smelters Securities Co., 120 Broadway, New York City, is in the market for a pair of bending rolls for export to Chile.

American Smelting & Refining Co., 165 Broadway, New York City, has put out inquiries for two more cranes, making a total number of six for which it is in the market.

W. E. Welborne, who is staying at the Hotel McAlpin, New York City, is purchasing a large amount of equipment for Russia.

The American Enamel Mfg. Co., 171 Madison avenue, New York City, has purchased the old Colwell Lead Co. plant at Elizabeth, N. J., and will erect about 12 buildings for the manufacture of cast iron pipe and fittings, enamel bath tubs, etc.

Architects Ring, Cleaves, Graham Co., 280 North Broad street, Elizabeth, N. J., is about ready to take bids on a foundry, pattern shop, plate shop, cradles, office, storage, etc., for a ship building plant to be erected by Samuel L. Moore & Sons Corporation.

building an $18,000, 2-story garage, 80 x 140 feet.

ST. LOUIS.—National Enameling & Stamping Co. is planning to add a rolling mill to its plant at Granite City, Ill., with equipment sufficient to roll 50-inch plates.

ST. LOUIS.—Westcott Motor Co. has been incorporated; $16,000 capital stock; by Charles P. Brandle, T. C. Brandle and H. P. Siegel.

ST. LOUIS.—Gravois Foundry & Mfg. Co. has been incorporated; $35,000 capital stock; by Isaac Jones, Frank J. Kroup and Thomas C. Gundlefinger.

ST. LOUIS.—W. K. Bixby, Lindell and Kings Highway boulevards, has plans in progress by T. P. Barrett Co., architect, Central National Bank building, for a 16-story hotel, 83 x 100 feet.

BANCROFT, IA.—Bonds for $10,000 have been voted for municipal electric light plant.

FAIRFIELD, IA.—Iowa Malleable Iron Co. will replace building, containing annealing ovens, with a $6,000 fireproof structure.

NEVADA, IA.—Iowa Railway & Lighting Co. is to build a 13,500-volt, 3-phase, transmission line from Nevada, Ia., to Colorado, Ia., with a sub-station and distributing system in Colorado, Ia.

OSKALOOSA, IA.—The plant of the Interstate Mfg. Co., furnaces and plumbing supplies, was damaged by fire to the extent of $17,000.

HARDWICK, MINN. — Bonds for $5,000 have been voted for improvements to the village power plant.

HIBBING, MINN.—Plans are on foot for a $500,000 municipal water system. City clerk can give details.

ROCHESTER, MINN.—Bids will be asked soon for construction of a $110,000 municipal electric light plant. A. F. Wright is city clerk.

SOUTHERN STATES

ALEXANDRIA, VA.—Self-locking Bushing Co., manufacturer, has been incorporated; with not more than $200,000 nor less than $105,000 capital stock, by James Pettibone, president, Albert W. Weikert, secretary, and Harry Williams, treasurer, all of Washington, D. C.

BRAMBLETON, VA.—Fire in the pattern house of R. W. Whitehurst Mfg. Co. did about $3,000 damage.

ASHEVILLE, N. C.—W. D. Riddick, president Azalea Woodworking Co., announces that plant recently damaged by fire, will be rebuilt and increased 50 per cent in size. The machinery is to be ordered.

GADSDEN, ALA.—Present barbed wire mill of the Gulf States Steel Co. will be enlarged 60 feet, to accommodate new machinery.

NESHOBA, MISS.—Bonds for $30,000 have been voted for a water works and sewerage system.

NAPOLEONVILLE, LA.—A packing plant will be erected in Napoleonville at cost of $30,000 to $40,000.

NEW ORLEANS. — National Fish, Game, Produce & Ice Co., 417 Audubon building, New Orleans, lately noted as incorporated, will open bids Sept. 1 on complete equipment of ice and refrigerating machines, costing $150,000. Two plants are to be equipped, with a capacity of 1,750 tons. Ralph W. Lees, engineer, Natchez, Miss.

AUSTIN, TEX.—Royse Ice & Electric Co., Rockwall county, has been incorporated; $16,000 capital stock; by J. T. Murphy, A. F. Davis, E. C. Murphy.

GALVESTON, TEX. — J. P. McDonough, proprietor of the McDonough Iron Works, has let a contract to the Crandall Engineering Co., East Boston, Mass., for a 1,500-ton railroad dry dock. Dredging and bulkheading have been begun.

GALVESTON, TEX.—Bids will be received until Aug. 26 by A. M. Burgess, superintendent of water works, for furnishing and erecting an air pumping engine at Alta Loma, Tex., including a 2,450-cubic foot air compressor, a surface condensor, on concrete foundations, and pipe connections.

HOUSTON, TEX. — Houston Terminal Warehouse Co. has plans to build an $800,000 warehouse, seven stories, 250 x 350 feet. Dunford, Moores & Dunford, engineers, 10 South LaSalle street, Chicago.

COTTON PLANT, ARK.—Cotton Plant & Southwestern railroad is to build a line 25 miles long from Cotton Plant to Kramer.

EUREKA SPRINGS, ARK.—Carroll county commissioners are planning to erect a steel bridge.

GRAVETTE, ARK. — A. C. Veach is interested in a 12-mile, electric railway, to be built from Melbourne, Ark., to Gravette, Ark., connecting with the St. Louis, Iron Mountain & Southern railroad.

CHATTANOOGA, TENN. — Hamilton county will issue $400,000 in bonds for a steel bridge over the Tennessee river, between Chattanooga and Moccasin Bend.

KNOXVILLE, TENN. — Southern Extract Co. will erect a $100,000 addition to its plant.

NASHVILLE, TENN.—Small motors and packing machinery will be required by M. E. Yergen, who is equipping a plant for manufacturing medicinal salt.

BIXBY, OKLA. — The city council has ordered an election on the issuance of $26,000 in bonds for water works construction. Address the mayor.

OKLAHOMA CITY.—Royal Zinc Mining Co. has been incorporated to develop zinc properties; $40,000 capital stock; by Clinton M. Lane, William M. Edwards and James O. Galoway.

WESTERN STATES

LINCOLN, NEB. — Plattner Implement Co., Denver, will locate here as soon as six buildings, upon which work will start shortly, are completed. Largest structure will be 50 x 200 feet.

SEWARD, NEB.—Fire damaged generators, switchboard and boilers of Seward Light & Water company's plant.

ATTICA, KAS.—F. H. Kilburn, Woodward, Okla., engineer, is preparing plans for a $15,000 municipal electric light plant.

FORT LEAVENWORTH, KAS. — United States disciplinary barracks will open bids Aug. 16 for a 10-ton, hand power crane.

HAVILAND, KAS.—Bonds for $7,000 have been voted for a municipal electric light plant.

KANSAS CITY, KAS. — Fire did about $50,000 damage to the repair shops of Santa Fe railroad.

KANSAS CITY, KAS. — Heidenrich Engineering Co., 714 Dwight building, Kansas City, Mo., is preparing plans for a $250,000 reinforced concrete grain elevator, capacity of 1,000,000 bushels, for the Union Pacific Railway Co.

PARKER, KAS. — Bonds for $5,000 have been voted for a municipal electric light plant. C. O. Conrad is city clerk.

SHARRON SPRINGS, KAS.—W. E. Hulse & Co., engineers, Hutchinson, Kas., are preparing plans for remodeling the electric plant at a cost of $10,000.

BILLINGS, MONT.—Montana Power Co. is to construct an addition to its electric plant, at an estimated cost of $20,000.

ROUNDUP, MONT.—This city will install about 100 ornamental light posts, costing about $100 each.

THREE FORKS, MONT.—Swearinger & McCulloch, Great Falls, Mont., are preparing plans and estimates for a $25,000 water works plant.

DENVER.—Van Sant-Houghton Engineering Co., San Francisco, Cal., is preparing preliminary plans for a $150,000 municipal water system.

PROVO, UTAH.—George C. Swan, city engineer, is making plans for a municipal electric light and power plant for Provo.

AUBURN, WASH.—J. W. Playman is to build a commercial garage and machine shop.

AUTOGENOUS, WASH.—Welding & Machine Co. has been incorporated; $5,000 capital stock; by Charles H. Jennings, Howard Curry, Warren Dutton and Frank M. Pabst.

BELLINGHAM, WASH.—Pacific American Fisheries Co. has selected a site and will start work shortly on an 80 x 300-foot machine shop.

SEATTLE.—Sunset Mfg. Co., recently incorporated by H. C. Jordan and others, is to establish a foundry to manufacture mechanical specialties.

SEATTLE.—Duplex Gas Service Co. has been incorporated to manufacture gas burning devices; $5,000 capital stock; by L. B. Steadman and F. A. Paul.

TACOMA, WASH. — Friddle Motor Co., James A. Friddle, president, has bought a site and will build a $50,000 automobile factory.

BURNS, ORE.—The city council has authorized $60,000 in bonds for a water works system; H. C. Levins, mayor.

MEDFORD, ORE.—Southern Oregon Traction Co. has bought a steam railroad, running from Medford to Jacksonville, Ore., and will electrify it. S. S. Bullis, Medford, is interested.

PORTLAND, ORE.—Columbia River Coal Dock Co. will place orders shortly for machinery for its plant at North Portland harbor; cost will approximate $75,000.

ST. HELENS, ORE.—Elliott Contracting Co., Portland, Ore., has contract for a three or 4-mile extension of logging railroad to be of standard gauge for the St. Helens Lumber Co.; work includes grading, bridges, etc.

BURBANK, CAL.—Board of city directors will ask bids soon on the construction of a municipal electric light plant for which $25,000 worth of bonds has been voted.

LINDSAY, CAL.—Foothill Packing Co. have let contracts for erection of orange packing plant. Automatic machinery will be installed.

PLACERVILLE, CAL.—Board of supervisors has ordered Saph & Rustmer, Sacramento, Cal., to prepare plans for a $10,000 steel bridge, with concrete abutments, over the south fork of the American river at Coloma.

READING, CAL. — Bids will be received until Aug. 21 by the board of supervisors for a combination steel and wooden bridge over Sacramento river, consisting of three spans, of 200 feet each, and approaches, each

SAN RAFAEL, CAL.—An election will be held Aug. 28 on issuing $300,000 in bonds for a municipal water system.

CANADA

WINNIPEG, MAN. — Bull Tractor Co. of Canada has been incorporated to build gas tractors and engines; $25,000 capital stock; by G. Coulver, Perry J. Procter and J. L. Collinson.

LONDON, ONT.—Owl Mfg. Co., Ltd., has been incorporated to manufacture vending machines; $10,000 capital stock; by W. S.

Laskbrook, F. J. Appleton and others.

OTTOWA ONT.—Keyes Supply Co., Ltd., has been incorporated to manufacture machinery; $15,000 capital stock; by Albert T. Loveday, John Baine and Corlis G. Keyes.

STRATFORD, ONT.—Speed Drilling Machie Co., Ltd., has been incorporated to manufacture machinery and agricultural implements; $50,000 capital stock; by John R. MacDonald and J. A. McFadden.

LACHINE, QUE.—Lachine Mfg. Co., Ltd., has been incorporated to manufacture iron and steel products; $120,000 capital stock; by J. A. Descarries, A. Descarries and R. LePailleur.

New Trade Publications

BLOWERS.—Turbo blowers are discussed in two pamphlets issued by the Southwark Foundry & Machine Co., Philadelphia. These blowers are according to Rateau designs. Numerous views of turbo blower installations are shown.

POWER TRANSMISSION MACHINERY. —The Mesta Machine Co., Pittsburgh, has issued a horsepower chart for power transmission machinery including gears, pulleys and rope wheels. The chart may be used for determining the variables for various parts which transmit power.

DISC CRUSHERS. — A 24-page catalog published in the Spanish language by Chalmers & Williams, Chicago Heights., Ill., is descriptive of the Symons disc crusher. Principles of design and method of operation are explained at considerable length, and the catalog is illustrated with numerous sectional and exterior views of the machine.

CENTRIFUGAL PUMPS. — The double suction vertical centrifugal pump built by the A. S. Cameron Steam Pump Works of the Ingersoll-Rand Co., New York City, is illustrated and described in a 16-page bulletin. Sectional views are included showing the construction of the pump and open impeller types also are illustrated.

AIR LIFT PUMPS.—Illustrated with sectional diagrams and ratio tables, the 16-page booklet of the Gardner Governor Co., Quincy, Ill., descriptive of its air compressor, for air lift pumping gives a clear idea of this method of pumping. Such pumps are used in wells where sand, small bore and other factors obviate against the use of other types.

CORRUGATED RECEPTACLES. — In a 24-page folder recently issued, the Wheeling Corrugating Co., Wheeling, W. Va., gives views and specifications of its line of corrugated receptacles, and bucket fire tanks. Nineteen styles of the former are illustrated. The bucket fire tanks consist of receptacles in which several buckets with balanced bails are nested.

PROTECTIVE PAINTS. — An interesting 32-page booklet is published by the Sherwin-Williams Co., Cleveland, descriptive of its protective paints for metal surfaces. The prevention of corrosion by means of painting is lucidly discussed. Numerous brands of Sherwin-Williams paints are described, samples of these paints being shown. Illustrations are presented showing the different classes of work for which these paints are adapted.

MACHINE TOOLS. — A 32-page catalog published by the Gisholt Machine Co., Madison, Wis., describes its universal tool grinder and other tools. The advantages obtained by the use of a tool-post tool grinder in the machine shop are discussed in an interesting and graphic manner. Other tools described include turret lathes and vertical boring and turning mills. The catalog contains numerous illustrations, including several charts.

FORGING HAMMERS.—A 16-page booklet issued by Beaudry & Co., Boston, describes the Beaudry hammer for light and heavy railroad machine, and general forging; and another type of hammer for plating, drawing, swaging, collaring, spindle-making, and general manufacturing. These hammers may be worked from all sides, the anvil clearing the main frame casting and allowing bars of any length to be worked either way of dies.

SANITARY BUBBLING FOUNTAINS.—The Manufacturing Equipment & Engineering Co., Boston, has issued a four-page folder with insert, describing its sanitary bubbling fountains made in styles and sizes to meet shop, factory, office and general needs, also metal sanitary and fireproof equipment for office and factory use. A four page leaflet illustrates the company's baked enameled metal chairs, furnished in several sizes and types.

GEARING.—The Horsburgh & Scott Co., Cleveland, have published a revised 80-page treatise on gearing. A number of valuable tables covering all types of gears, together with useful information and diagrams are presented. A complete catalog of the company's products is included. These comprise rawhide, cut metal, planed bevel, herringbone, spiral, and worm gears; racks and worms. Among the views presented are several illustrating the manufacture of gears.

BORING AND TURNING MILLS.—In a 44-page catalog published by the Gisholt Machine Co., Madison, Wis., are described boring and turning mills manufactured by this company. These tools include 30-inch, 36-inch, 42-inch, 48-inch, 52-inch, 60-inch and 72-inch vertical boring and turning mills; and a 48-inch vertical boring mill with swivel plain head and swivel turret head. All machines shown are belt driven. Illustrated descriptions of methods of mounting variable and constant speed individual motor drive on boring mills are also given.

ARC WELDER.—The variable voltage arc welding outfit manufactured by the Lincoln Electric Co., Cleveland, is described in a 24-page booklet which gives an interesting resume of electric arc welding and its uses. Many illustrations are presented. An important feature claimed for this outfit is that it generates at all times exactly the amount of voltage required by the arc, with a constant current. It is further claimed that no resistance is necessary. This feature, it is said, is the result of special windings on the generator.

ELECTRIC GRINDERS. — An eight-page bulletin issued by the Chicago Pneumatic Tool Co., Chicago, is devoted to its line of electric grinders especially adapted for use in foundries, machine and structural shops. While these grinders have been on the market for several years, they recently have been improved materially by the incorporation of a new ventilating system for the windings and three ball bearings for the shaft or arbor, with excellent provision for lubrication. The grinders illustrated and described include heavy duty portable; universal portable, direct or single-phase alternating current; universal portable surface; tool post, pedestal and electric precision types.

SLOTTING MACHINE.—A 32-page catalog published by the Newton Machine Tool Works, Inc., Philadelphia, describes its lines of standard and special slotters, driven by crank, screw, rack and pinion, belt, pneumatic clutch or reversible motor. Numerous designs of milling, boring, drilling and cold saw cutting-off machines are also illustrated. The development of high speed steel and of motor drive has been an important factor, it is said, in the redesigning of these machines. Illustrations of 32 types of machines are shown.

REINFORCING METAL. — In a 64-page catalog recently issued, the Corrugated Bar Co., Buffalo, N. Y., describes its corrugated metal reinforcing mesh designed for use in roofs, ceilings, floors, exterior walls and partitions, also for stucco work, fences, culverts, conduits, sewers, tanks, etc. The material consists of ribbed metal sheets expanded into a diamond mesh with a piece of plain metal left in the center for additional strength. It is supplied in flat and arched shapes for various needs. The illustrations include numerous details of design and construction.

PNEUMATIC TOOLS. — Three bulletins have been issued by the Ingersoll-Rand Co., New York City, devoted respectively to floor and bench rammers, plug drills adapted for operations on stone, granite, etc., and a drill adapted for operations on metal and wood. The floor and bench rammers are used for making molds and also can be applied in concrete work. In foundries their use is said to effect great economies since they prove less tiresome to the operator than the employment of hand tools. The drill for metal and wood operations is described in detail and various sizes and types are shown. Numerous service views also are included.

DIESEL TYPE ENGINE. — The Southwark-Harris two cycle marine and stationary diesel engines are described in a 44-page catalog published in attractive form by the Southwark Foundry & Machine Co., Philadelphia. This engine, it is claimed, eliminates any danger of cracked cylinders by relegating the air starting and reversing functions to its lower or scavenging cylinder, which forms a unit with the working cylinder. Features of the engine are the comparative freedom from valves, and, the ability which it is said to possess of starting from a stone cold condition to full power in 10 seconds under full load, by employing the scavenging cylinder as a starting device. Lower pressure of the starting air is made possible by the larger area of the step pistons. Southwark-Harris marine engines are manufactured in 12 types, ranging from two to eight cylinders and from 120 to 1,600 indicated horsepower. Southwark-Harris stationary engines are built in two to six cylinder models of nine types, of from 120 to 1,200 indicated horsepower. The catalog also describes the Southwark-Harris type air compressors for high or low pressure, to be used as auxiliaries to diesel engines.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to Dec. 31.)

Bessemer, valley	$14.25
Bessemer, Pittsburgh	15.20
Basic, Pittsburgh	13.95
Basic, eastern Pa.	14.25
Malleable, Pittsburgh	13.70 to 13.95
Malleable foundry, Chicago	13.00
Malleable foundry, Philadelphia	15.00 to 15.25
Malleable foundry, Buffalo	13.00
No. 1X foundry, Philadelphia	14.75 to 15.00
No. 2 foundry, Pittsburgh	13.70 to 13.95
No. 2 foundry, valley	12.75 to 13.00
No. 2 foundry, Cleveland	13.50
No. 2 foundry, Ironton	13.25 to 13.75
No. 2 foundry, Chicago	13.00
No. 2X foundry, Philadelphia	14.50 to 14.75
No. 2X fdy., N. J. tidewater	14.75 to 15.00
No. 2X foundry, Buffalo	13.00
No. 2 plain, Philadelphia	14.25 to 14.50
No. 2 plain, N. J. tidewater	14.25 to 14.50
No. 2 plain, Buffalo	12.50 to 12.75
No. 2 southern, Birmingham	10.50
No. 1 southern, Cincinnati	13.40
No. 2 southern, Chicago	13.50 to 14.00
No. 2 southern, Phila. delivery	14.00 to 14.25
No. 2 southern, Cleveland	13.50 to 14.00
No. 2 south'n, New York docks	13.75 to 14.00
No. 2 southern Boston, docks	13.75 to 14.00
No. 2 south. interior, New Eng.	14.50 to 15.50
No. 2 southern, St. Louis	13.40
Virginia No. 2X furnace	12.50 to 13.00
Virginia 2X, Philadelphia	15.25
Virginia 2X, Jersey City	15.50
Virgina 2X, Boston points	15.75
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.20 to 13.45
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Jackson, O.	16.00
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	21.50 to 21.75
Lebanon low phos., furnace	16.50 to 17.00
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.25
Charcoal, Buffalo	15.75 to 17.00
Charcoal, Birmingham	21.50

IRON ORE

Lake Superior Ores.

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.45
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.80

FOREIGN ORES

(Per unit Philadelphia.)
(Prices nominal.)

Foreign Bess., 50 to 65 per cent	8 to 8½c
For'n non-Bes., 50 to 65 per cent	8 to 8½c

COKE

(At the ovens)

Connellsville furnace	$1.70 to 1.80
Connellsville fur. contr.	1.75 to 1.80
Connellsville furnace coke, fourth quarter	1.75
Connellsville foundry	2.00 to 2.50
Connellsville fdy. contr.	2.25 to 2.60
Wise county furnace	2.00 to 2.25
Wise county foundry	2.40 to 2.60
Pocahontas furnace	2.00 to 2.50
Pocahontas foundry	2.25 to 2.50
New River, foundry	2.50 to 3.25
New River, furnace	2.25 to 2.50

FERRO-ALLOYS

Ferro mang., furnace (prompt)	$95 to 100
Ferro mang., Balti. (future)	95 to 100
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent.	18.00 to 18.50
Ferro-sil., 11 to 12 per cent.	17.00 to 17.50
Ferro-sil., 10 to 11 per cent.	16.00 to 16.50
Ferro-sil., 9 to 10 per cent.	15.00 to 15.50
(Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville.)	
Ferro-carbon titanium, carloads, per lb.	8c to 12½c
Ferro vanadium, Pbgh. per lb. alloy	$2.25
Ferro tungsten, per lb. of alloy	2.50
Ferro chrome, per lb., Niagara Falls	20c

SEMI-FINISHED STEEL

Open hearth billets, Phila.	$25.06
Forging billets, Phila.	29.00 to 30.00
Forging billets, Pbgh.	28.00 to 29.00

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.45
From Pittsburgh	.619
From Youngstown	.619
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Wire rods, Pittsburgh	$26.00
Bess. bill., Youngstown	22.00
Open hearth billets, Youngstown	22.50
Bessemer billets, Pittsburgh	23.00
Open hearth billets, Pittsburgh	24.00
Bess. sheet bars, Youngstown	23.00
Op. h'th sheet bars, Youngstown	24.00
Bess. sheet bars, Pittsburgh	24.00
Op. h'th sh. bars, Pbgh.	25.00
Muck bar, Pittsburgh	27.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs. Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbg. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chgo.	21.50 to 22.50
Angle bars, st. sect, Pbgh. base.	1.50c
Angle bars, st. sections, Chicago	1.50c
Spikes, railroad, Pbgh.	1.40c
Spikes, railroad, Chgo	1.50c to 1.55c
Track bolts, Pbgh.	1.95c to 2.00c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	3.00
New England	3.00
Philadelphia	2.79
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago, to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.30c
Structural shapes, Chicago	1.49c
Structural shapes, Philadelphia	1.409c to 1.459c
Structural shapes, New York	1.419c to 1.469c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.44c to 1.49c
Tank plates, Pittsburgh	1.30c
Tank plates, Philadelphia	1.409c to 1.459c
Tank plates, New York	1.419c to 1.469c
Bars, soft steel, Pittsburgh	1.30c
Bars, soft steel, Chicago	1.49c
Bars, soft steel, Philadelphia	1.409c
Bars, soft steel, New York	1.469c
Hoops, carloads, Pittsburgh	1.30c
Bands, Pittsburgh	1.30c
Shafting, Pbgh., contr.	61 to 66 off
Bar iron, Chicago	1.20c to 1.25c
Bar iron, Philadelphia	1.22c to 1.27c
Bar iron, New York	1.20c to 1.25c
Bar iron, Cleveland	1.20c to 1.25c
Bar iron, Pittsburgh	1.25c to 1.30c
Hard steel bars, Chicago	1.25c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.75c to 1.80c
No. 28, black, Chicago	1.99c
No. 28, tin mill, black, Pbgh.	1.80c to 1.85c
No. 28, galvanized, Pbgh.	4.25c to 4.75c
No. 28, galvanized, Chgo., nom.	
No. 10, blue, anld., Pbgh.	1.35c to 1.40c
No. 10, blue, annealed, Phila.	1.559c to 1.609c
Tin plate, 100 lb., coke base.	3.10c to 3.20c

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll, and re-anl.	30 cents
Hot roll'd pick'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squarring	10 cents
Roller leveling	10 cents
Patent leveling and re-squarring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents
No reduction for sheets not annealed.	

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ¾ to 3 inches	79	57½
Iron, ¾ to 2½ inches	71	46
	Lap-weld.	
Steel, 2½ to 6 inches	78	62½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	72
Iron, 3½ to 4½ inches l. c. l.	61

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nail jobbers, Pittsburgh	$1.60
Plain wire, jobbers, Pittsburgh	1.40
Galvanized wire, jobbers, Pbgh.	2.20
Polished staples, Pbgh.	1.70
Galvanized staples, Pbgh.	2.50
Barb wire, painted, jobbers, Pbgh.	1.70
Barb wire, galv., jobbers, Pbgh.	2.50

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 75, 10, 10 and 10; cut threads 75, 10 and 10; larger or longer, 75 and 10.

Machine bolts with hot pressed nuts ⅜ x 4 inches, 'smaller or shorter, rolled 75, 10, 10 and 10; cut, 75, 10, 10 and 5; larger or longer, 75 and 10.

Gimlet and cone point lag or coach screws, 80 and 20.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.10.

Cold pressed square, blank or tapped, $5.80 off; hexagon, blank or tapped ⅜ inch and larger, $7.25; ⅜-inch and smaller, $8.00.

RIVETS

Structural rivets, Pbgh	1.50c to 1.60c
Structural rivets, Chgo	1.75c
Boiler rivets, Pbgh	1.60c to 1.70c
Boiler rivets, Chgo	1.85c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon.	Base price Cut to length	
	Hard.	Soft.
1½ inch and wider.	2.95	3.20
0.100 and thicker	3.05	3.30
0.050 to 0.099 inc.	3.20	3.45
0.035 to 0.049 inc.	3.45	3.85
0.031 to 0.034 inc.	3.70	4.10
0.025 to 0.030 inc.	3.90	4.30
0.020 to 0.024 inc.	4.80	5.30
0.017 to 0.019 inc.	5.20	5.70
0.015 and 0.016	6.05	6.55
0.013 and 0.014	6.65	7.15
0.012	7.00	7.50
0.011	7.35	7.85
0.010		
	Coils.	
0.100 and thicker	2.85	3.10
0.050 to 0.099 inc.	2.90	3.15
0.035 to 0.049 inc.	3.05	3.30
0.031 to 0.034 inc.	3.20	3.60
0.025 to 0.030 inc.	3.30	3.70
0.020 to 0.024 inc.	3.40	3.80
0.017 to 0.019 inc.	3.60	4.20
0.015 and 0.016	4.10	4.60
0.013 and 0.014	4.80	5.30
0.012	5.15	5.65
0.011	5.50	6.00
0.010	5.85	6.35

CAST IRON WATER PIPE

Four-inch, Chicago	26.00
Six-inch and larger, Chicago	24.00
Six-inch, New York	22.00 to 22.50
Four-inch, New York	22.50 to 23.00
Four-inch, Birmingham	21.00
Six-inch and larger, Birmingham	19.00

Light weight water and gas pipe, $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.80c
Steel bars, Philadelphia	1.80c
Steel bars, New York	1.90c
Steel bars, St. Louis	1.70c
Steel bars, St. Paul	1.75c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.65c
Iron bars, New York	1.70c to 1.75c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.80c
Shapes and plates, New York	1.95c
Shapes and plates, St. Paul	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve	2.05c
No. 10 blue anl. sh. St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	2.00c
No. 10 blue anl. sheets, St. Paul	1.95c
No. 28 black sheets, Chgo	2.45c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 black sheets, St. Paul	2.50c
No. 28 galv. sheets, Chicago	4.50c to 4.70c
No. 28 galv. sheets, Cleveland	4.50c to 5.00c
No. 28 galv. sheets, Cincinnati	5.50c to 6.00c
No. 28 galv. sheets, St. Paul	5.50c to 6.00c
No. 28 galvanized sheets, St. L.	4.70c to 5.00c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo.	$ 9.50 to 10.00
No. 1 railroad wrought, Cleve.	9.25 to 9.50
No. 1 railroad wrought, St. L.	9.50 to 10.00
No. 1 railroad wrought, Cincin.	7.50 to 8.00
No. 2 railroad wrought, Chgo.	9.50 to 10.00
No. 2 railroad wrought, St. L.	8.75 to 9.25
Arch bars and transoms, Chgo.	12.50 to 13.00
Arch bars and transoms, St. L.	12.00 to 12.50
Knuckles, coup. & spr'gs, Chgo.	9.25 to 9.75
Knuckles, coup. & spr'gs, St. L.	9.50 to 10.00
Shafting, Chicago	12.25 to 12.75
Shafting, St. Louis	12.00 to 12.50
Steel car axles, Chicago	10.25 to 10.75
Steel car axles, St. Louis	11.50 to 12.00
Locomotive tires, Chicago	8.75 to 9.25
Locomotive tires, St. Louis	9.50 to 10.00
Cut forge, Chicago	9.00 to 9.25
Pipes and flues, Chicago	6.50 to 7.00
Pipes and flues, Cleveland	7.25 to 8.00

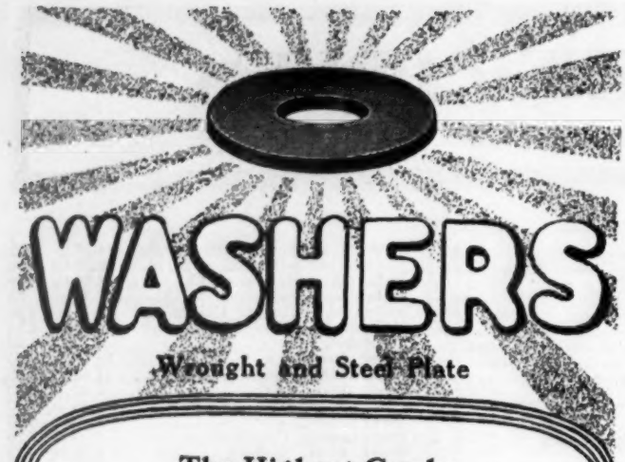
Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	75 cents
Pacific coast, (tin plate)	70 cents
Pacific coast, via Panama canal	61.9 cents

Pipes and flues, St. Louis	7.00 to 7.50
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	10.00
No. 1 cast, Cleveland	8.50 to 9.00
No. 1 cast, St. Louis	9.50 to 10.00
No. 1 busheling, Chicago	7.25 to 7.75
No. 1 busheling, Cleveland	8.50 to 8.75
No. 1 busheling, Cincinnati	6.00 to 6.50
No. 1 busheling, St. Louis	7.50 to 8.00
No. 2 bushcling, Chicago	6.00 to 6.50
No. 1 boiler plate, cut, Chgo.	5.50 to 5.75
No. 1 boiler plate, cut, St. L.	6.50 to 7.00
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	5.25 to 5.50
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.75 to 5.25
Cast borings, St. Louis	5.50 to 6.00
Machine shop turnings, Chicago	5.00 to 5.50
Machine shop turnings, Cleve.	5.75 to 6.00
Machine shop turnings, Cincin.	$ 4.25 to 4.75
Machine shop turnings, St. L.	6.00 to 6.50
Malleable agricultural, Chicago	8.00 to 8.25
Malleable agricultural, St. Louis	7.25 to 7.75
Malleable, railroad, Chicago	8.75 to 9.25
Malleable, railroad, Cincinnati	6.00 to 6.50
Malleable, railroad, St. Louis	8.00 to 8.50
Angle bars, iron, Chicago	12.50 to 13.00
Angle bars, iron, St. Louis	12.00 to 12.50
Angle bars, steel, Chicago	9.00 to 9.50
Angle bars, steel, St. Louis	9.50 to 10.00
Stove plate, Chicago	8.00 to 8.25
Stove plate, Cleveland	8.00 to 8.25
Stove plate, Buffalo	8.25 to 8.75
Stove plate, Cincinnati	6.00 to 6.50
Stove plate, St. Louis	8.00 to 8.25
Bundled sheet, Cincinnati	4.75 to 5.25

(Gross tons.)

Heavy melting steel, Pbgh	$12.00 to 12.25
Heavy melting steel, Buffalo	10.50 to 11.00
Heavy melting steel, Chicago	11.50 to 11.75
Heavy melting steel, Cleveland	11.00 to 11.50
Heavy melting steel, Cincinnati	8.50 to 9.00
Heavy melting steel, eastern Pa.	12.50 to 13.00
Heavy melting steel, New York	9.50 to 9.75
Heavy melting steel, St. Louis	10.75 to 11.25
Grate bars, Buffalo	9.00 to 9.50
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	13.50 to 14.00
No. 1 railroad wrought, Pbgh	11.25
No. 1 R. R. wrght., New York	11.00 to 11.50
No. 1 R. R. wrought, Buffalo	10.50 to 11.00
Shafting, New York	13.00 to 13.50
Shafting, eastern Pa.	15.00 to 15.50
Wrought pipe, New York	9.50 to 10.00
Wrought pipe, eastern Pa.	11.50 to 12.00
Mch. shop turnings, New York	6.50 to 6.75
Machine shop turnings, Buffalo	5.75 to 6.25
Mch. shop turnings, Pbgh	7.50 to 7.75
Mch. shop turnings, eastern Pa.	8.75 to 9.25
Cast borings, New York	6.75 to 7.00
Cast borings, eastern Pa.	8.50 to 9.00
Cast borings, Buffalo	6.50 to 6.75
Cast borings, Pittsburgh	9.00
Stove plate, N. J. points	9.00 to 9.50
Stove plate, Pittsburgh	8.25 to 8.75
Stove plate, eastern Pa.	9.50 to 10.00
Shoveling steel, Chicago	10.50 to 11.00
Shoveling steel, St. Louis	9.50 to 10.00
Reroll. rails, 5 ft. & ov., Pbgh.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., Chgo.	11.25 to 11.75
Reroll. rails, 5 ft. & ov., Cleve.	10.50 to 11.00
Reroll. rails, 5 ft. & ov., E. Pa.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., St. L.	12.00 to 12.50
Steel rails, short, Chicago	11.25 to 11.75
Steel rails, short, Cleveland	11.75 to 12.00
Steel rails, short, St. Louis	10.50 to 11.00
Iron rails, Cleveland nom.	11.75 to 12.00
Iron rails, Chgo.	12.25 to 12.75
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, St. Louis	12.00 to 12.50
Frogs, switches, guards, Chgo.	10.50 to 11.00
Frogs, switches, guards, St. L.	10.50 to 10.75
Car wheels (iron), Pittsburgh	12.25 to 12.50
Car wheels (steel), Pittsburgh	12.25 to 12.50
Car wheels, Chicago	11.00 to 11.25
Car wheels, eastern Pa.	12.25 to 12.75
Car wheels, Buffalo	10.00 to 10.50
Car wheels, N. J. points	10.00 to 10.50
Car wheels, St. Louis	11.00 to 11.50
Iron axles, Pittsburgh	17.50
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	18.50 to 19.00
Iron axles, Chicago	15.50 to 16.00
Iron axles, Buffalo	16.00 to 16.50
Iron axles, St. Louis	15.00 to 15.50
Steel car axles, New York	13.50 to 14.00
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.00 to 12.50
Steel car axles, eastern Pa.	14.00 to 14.50
No. 1 busheling, Buffalo	8.50 to 9.00
No. 1 busheling, Pittsburgh	9.75 to 10.00
No. 2 busheling, Buffalo	6.50 to 7.00
Low phos. steel, Buffalo	12.50 to 13.00
Low phosphorus steel, Pbgh.	15.50 to 16.00
Low phos. steel, eastern Pa.	15.00 to 15.50
No. 1 forge, eastern Pa.	8.75 to 9.25
No. 1 cast, eastern Pa.	12.25 to 12.75
No. 1 cast, Pittsburgh	11.75 to 12.00
No. 1 heavy cast N. J. points	11.75 to 12.25
Mall, railroad, Cleveland	10.25 to 10.50
Malleable railroad, Pittsburgh	10.50
Malleable railroad, Buffalo	9.50 to 10.00
Malleable railroad, east Pa.	9.25 to 9.75
Bundled sheet, Pittsburgh	10.00 to 10.25
Bundled sheet, Cleveland (nom.)	8.50 to 9.00
Bundled sheet, Buffalo	7.00 to 7.50



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Relation of Production to Costs

(*Continued from page* 268)

ciple: *The indirect expense chargeable to the output of a factory bears the same ratio to the indirect expense necessary to run the factory at normal capacity, as the output in question bears to the normal output of the factory.*

This theory of expense distribution, which was forced upon us by the abrupt change in conditions brought on by the war, explains many things which were inexplicable under the older theory, and gives the manufacturer uniform costs as long as the methods of manufacture do not change. Under this method of distributing expense there will be a certain amount of undistributed expense remaining whenever the factory runs below its normal capacity. A careful consideration of this item will show that it is not chargeable to the product made, but is a business expense incurred on account of our maintaining a certain portion of the factory idle, and is chargeable to profit and loss. Many manufacturers have made money in a small plant, then built a large plant and lost money for years afterwards, without quite understanding how it happened. This method of figuring gives a clear explanation of that fact and warns us to do everything possible to increase the efficiency of the plant we have, rather than to increase its size.

This theory seems to give a satisfactory answer to all the questions of cost that I have been able to apply it to, and during the past few months I have laid it before a great many capable business men and accountants. Some admitted that this viewpoint would produce a very radical change in their business policy, and are already preparing to carry out the new policy. It explains clearly why some of our large combinations of manufacturing plants have not been as successful as was anticipated, and why the small, but newer, plant is able to compete successfully and make money, while the combinations are only just holding their own. The idea so prevalent a few years ago, that in the industrial world money is the most powerful factor, and that if we only had enough money, nothing else would matter very much, is beginning to lose its force, for it is becoming clear that the size of a business is not so important as the policy by which it is directed. If we base our policy on the idea that the cost of an article can only legitimately include the expense necessarily incurred either directly or indirectly, in producing it, we shall find that our costs are much lower than we thought and that we can do many things which under the old method of figuring appeared suicidal.

A False Viewpoint

The view of costs so largely held, namely, that the product of a factory, however small, must bear the total expense, however large, is responsible for much of the confusion about costs and hence leads to unsound business policies. If we accept the view that the article produced shall bear only that portion of the indirect expense needed to produce it, our costs will not only become lower, but relatively far more constant, for the most variable factor in the cost of an article under the usual system of accounting has been the "overhead", which has varied almost inversely as the amount of the product. This item becomes substantially constant if the "overhead" is figured on the normal capacity of the plant. Of course, a method of accounting does not diminish the expense, but it may show us where the expense properly belongs, and give us a more correct understanding of our business.

In our illustration of the three factories, the cost in the Chicago factory remained constant, but the expense of supporting the Buffalo and Albany factories in idleness was a charge against the business, and properly chargeable to profit and loss. If we had loaded this expense on the

product of the Chicago factory, the cost of the product would probably have been so great as to have prevented our selling it, and the total loss would have been greater still. When the factories are distinctly separate, few people make such a mistake, but where a single factory is three times as large as is needed for the output, the error is frequently made, with results that are just as misleading. *As a matter of fact, it seems that the attempt to make a product bear the expense of plant not needed for its production is one of the most serious defects in our industrial system today, and farther reaching than the differences between employers and employes.*

The problem that faces us is then first to find just what plant, or part of a plant, is needed to produce a given output, and to determine the "overhead" expense on operating that plant, or portion of a plant. This is primarily the work of the manufacturer, or engineer, and only secondarily that of the accountant, who must, as far as costs are concerned, be the servant of the superintendent. In the past, in almost all cost systems the amount of "overhead" to be charged to the product, when it did not include *all* the "overhead", was more or less a matter of judgment. According to the theory now presented, it is not a matter of judgment, but can be determined with an accuracy depending upon the knowledge the manufacturer has of the business. Following this line of thought, it should be possible for a manufacturer to calculate just what plant and equipment he ought to have, and what the staff of officers and workmen should be to turn out a given profit. If this can be correctly done, the exact cost of a product can be predicted. Such a problem cannot be solved by a cost accountant of the usual type, but is primarily a problem for an engineer, whose knowledge of materials and processes is essential for its solution. Having made an attempt to solve a problem of this type, one of the most important functions we need a cost system to perform is to keep the superintendent continually advised as to how nearly he is realizing the ideal set, and to point out where the shortcomings are.

Many of us are accustomed to this viewpoint when we are treating individual operations singly; but few have as yet made an attempt to consider that this idea might be applied to a plant as a whole, except when the processes of manufacture are simple and the products few in number. When, however, the processes become numerous or complicated, the necessity for such a check becomes more urgent, and the cost keeper who performs this function becomes an integral part of the manufacturing system, and acts for the superintendent, as an inspector, who keeps him advised at all times of the quality of his own work. This conception of the duties of a cost keeper does not at all interfere with his supplying the financier with the information he needs, but insures that information shall be correct, for the cost keeper is continually making a comparison for the benefit of the superintendent, of what has been done with what should have been done. Costs are valuable only as comparisons, and comparisons are of little value unless we have a standard, which it is the function of the engineer to set. Lack of reliable cost methods has, in the past, been responsible for much of the uncertainty so prevalent in our industrial policies; but with a definite and reliable cost method, which enables us to differentiate between what is lost in manufacturing and what is lost in business, it will usually become easy to define clearly the proper business policy.

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